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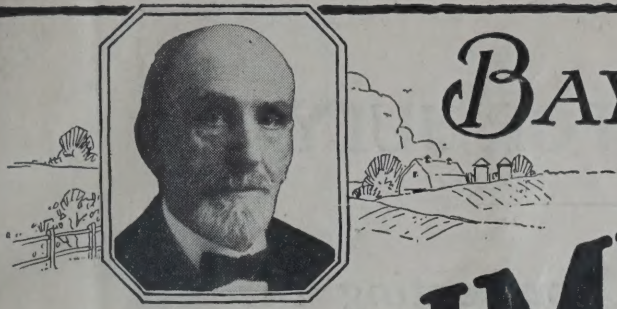

BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW
WHERE ONE NOW GROWS"

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JAN 9 1924

EDITED BY JAS. BAYNES, 38 YEARS EDITOR OF THE AMERICAN SWINEHERD

Vol. 1 JULY 1, 1923 No. 1

AGRICULTURAL LIBRARY

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OUR MISSION

TO ADVANCE the farmers' interests by aiding in maintaining, renovating, restoring and improving worn out or reduced yielding qualities of the SOIL, the life blood and soul of the farm.

BAYNES SOIL IMPROVER

The only paper specializing on this subject of vital importance to the farm. We will give systems and approved plans to enrich the soil by home made manures, commercial fertilizers, crop rotation, diversifying and intensifying on tried plans to increase the soil's productiveness.

We will work in harmony with the U. S. Dept. and State Departments of Agriculture.

* * * Having great faith in the value of the efficient scientific work of the Agricultural Colleges and Experiment Stations we will present a review of their important and helpful research for the farmer in a plain untechnical manner for practice. Believing in the value of County Agents and Farm Advisers helpfulness to the farmers, it is our aim to co-operate with them as well as the American Farm Bureau Federation, the Farmer's strong fortress in advancing and protecting his interests.

* * * We hope by our efforts to benefit farmers immeasurably in enlarging their crop yields and lightening their labor burdens, showing the value of improved farm machinery and implements, the conservation of the natural resources of the farm and the most improved methods combating and regulating the troublesome insect pests and plant diseases.

THIS IS OUR MISSION

and when fulfilled we hope to share in the honor of enabling the AMERICAN FARMER to make himself the World's greatest, wisest and richest agriculturist.

Published monthly by JAS. BAYNES & CO., *Webster Bldg., Chicago, Ill.*

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1

CONTENTS FOR JULY

The Vital Topics confronting the thinking farmers of today—

To grow crops profitably you must increase your yield — to increase your yield you must fertilize.

Agricultural Colleges and Experiment Stations.
Lifting Farming Out of the Old and Deep Ruts.
A Broad Soil Awakening.
High Analysis Brands of Fertilizers.
Manure Waste. 3

Balance Soil Ration.
Must Feed to Grow or Work.
Methods of Soil Improvement.
Double Barrel Legumes.
Michigan for Alfalfa.
The American Swineherd. 4

Editorials.
The Honored Farmer.
Editor's Explanation.
Ohio Corn Scouts. 5

What Is Intense Farming?
Pure Bred Seed.
The New Era Soil Club.
The Leading Dairy State.
The Farm Treasure.
Farming Methods Wrong.
The Legume Era. 6

The Farm Business.
Don't Become Flurried.
Worn Out Farm Tonic. 7

Benefits from Gypsum on Alfalfa Lands.
The Early Soil Bandit. 8

How Forty Ohio Farmers Grew Over 100 Bushels of Corn Per Acre. 9

More Legumes.
The Stored Nitrogen.
Portable Crushers Solve Lime Problem.
Gypsum Saves Nitrogen.
Farmers Call Lime Investment. . . 10

Clover Retards Soil Loss.
Grow More Soy Beans for Fertility.
A New Corn Champion.
Cultivate Less Acres.
Rotation Doubled Yield.
Rotation of Crops. 11

County Agent Promotes Farmers' Interests.
Well Worth Knowing.
What to Fertilize? 12

The Labor Saving Age.
The Saving Clause.
We Want More Burbanks. . . . 13

Soil Erosion and its Preventative.
More Legumes.
Tramping Soil Harmful. . . . 14

Farming vs. Mining. 15

Handling Manure on the Farm.
Commercial Fertilizer vs. Manure. 16

What Crops Are Made of.
Liberating Plant Food.
When to Use Lime or Limestone.
Keep the Soil Productive.
Saved Soil and Won Fame.
Soil Built Up By Sweet Clover. . . 17

American Farm Bureau News.
The Nation's Stronghold.
Co-operative Marketing.
Pays Big Dividends.
Studying Resources.
Crop Requirements. 19

Bulletins Received.
Mo's 1922 Year Book.
Chinch Bug Inoculation NG.
Fertilize the Corn Crop.
Crop Rotation.
The Hoosier's Call.
Successful Corn Show. 20

Missouri's Soil Map.
Valuable Practical Schooling.
The Sick Field.
The Early Use of Gypsum.
Protect the Soil.
Rotation First Step to Establish Fertility. 21

Weeding Meadows.
Does Hill Fertilization of Corn Restrict Root Growth?
Stop the Corn Borer.
What Washes Out the Soil?
Bigger Crops to Lower Bushel Cost of Production.
Humus a Soil Necessity. 22

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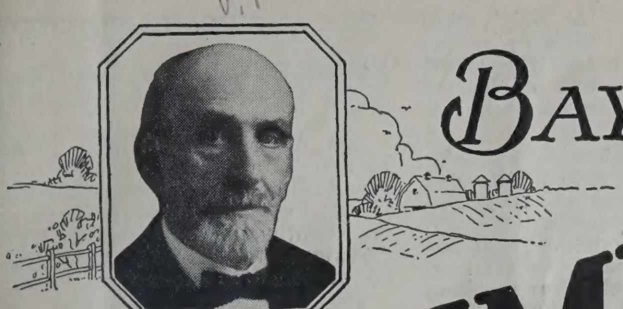

BAYNES' SOIL IMPROVER

*"MAKE TWO BLADES GROW
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Vol. 1 July 1, 1923 No. 1

AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS

These worthy promoters of the agricultural interests of the national are a great aid in placing the farmers of this country in the progressive lead of the world's husbandmen.

These great public institutions for advancing the cause of agriculture are yearly growing in power and utility, and their practical value becoming more thoroughly realized by the general farmer. The agricultural colleges and experiment stations are turning out each year a great body of young, graduated, scientific farmers, trained for practical, progressive, successful agriculturists. The experiment station is a most valuable aid for the farming community in evolving tested knowledge gained from costly experience, both in time and money. This proven beneficial skill is separated from the impracticable and furnished the farmer free from cost. The immense worth of this service to agriculture and the nation is incalculable. This paper shall make a specialty in keeping in close, friendly communication with these government instructors that our readers may be favored with the progressive results of their work. We will endeavor to give these reviews in plain words easily to be understood by common farmers.

LIFTING FARMING OUT OF OLD AND DEEP RUTS

The excellent and continuous work in advancing the methods of farming, through the action and influence of the Agricultural Colleges and Experiment Stations, joining reasonable theories and science with practical performance, is teaching so plainly and completely that it becomes effective in reaching the farmers where most needed.

While this successful work is of great personal value to the individual, it is of tremendous worth to the country at large, in the increased production and the improvement in the yielding power of the soil. The bettering and advancement of the quality of the live stock and the manner of feeding and developing it will add to the assets of the person ten fold and to the community ten times ten.

Among these officers and professors of the various agricultural institutions, there will be found men today who are doing work of a character that will match that of our great statesmen, past or present, as benefactors of their country.

A BROAD SOIL AWAKENING

There are opening of eyes among the farmers which extends to those that are old timers and who have been working on the plans pursued by their fathers, they are looking for causes of the decreased yield and profits of the farm.

They naturally look deeper into the subject when their attention is called to the health and strength of their farm. The fertility of the soil is the real life blood of the farm. A farm with an exhausted soil is an expense, instead of a profit. It needs repairing for productiveness.

Fortunately the Agricultural Colleges and Experiment Stations have been preparing to meet this trouble and have worked out the best methods of restoring the weakened sick heart of the farm. Their experience is free to you if you will make an effort to get it. The fertility is the real life and value of the farm. It once had the ability to grow plant and grain in response to farming procedure. But overworked and underfed brought on its exhaustion and the necessity of restoring its fertility and productiveness.

The "BAYNES' SOIL IMPROVER" will carry the experience and methods freely, much of which has been obtained at greater cost than individuals can afford. But the results of their work can be used to put the yielding capacity of the farm at its highest point and even higher than when formerly at its best.

That it may be done economically, it is first necessary to have a survey and an analysis of the soil to see just what is needed in plant food, and thus prevent supplying that which is not demanded.

There is a strong call on the Agricultural Colleges for Survey parties to furnish the constituents of their soil. The counties are having large bodies or the whole county surveyed This shows the fact there is quite a general awakening on the subject. This will start the farm on the road for larger production.

HIGH ANALYSIS BRANDS OF FERTILIZERS

The United States Agricultural Department, Experiment Stations, Reliable Manufacturers of Fertilizers and the National Fertilizer Association have approved and recommended the use of "High Analysis Fertilizers" as the safest, cheapest and best for the farmers' benefit.

"The National Fertilizer Association have resolved to urge upon its members the manufacture and sale of high-analysis fertilizers, containing not less than 14 units of plant food."

This is done for the protection of the farmers' interests. The United States Secretary of Agriculture has approved of this action in the following words: "The stand taken by the fertilizer industry for the elimination of the low-analysis mixtures and the useless, wasteful multiplicity of brands must ultimately react to the benefit of manufacturer and consumer alike." Henry C. Wallace, Secretary.

The Purdue Experiment Station, Indiana. Professor A. T. Wianco, Chief of the Department of Soils and Crops, says, "There is no one subject of greater importance to Indiana farmers than the maintenance of the fertility of the soil. This is true even though the most approved system of soil culture is followed, because most Indiana soils no not contain sufficient elements of plant food to produce maximum yields. Generally some kind of fertilizer may be used to advantage."

Farmers should take advantage of this information in buying their fertilizers.

MANURE WASTE.

A few years ago the Asst. Secy. of Agr. startled the country with the statement that the world's manure waste was a billion dollar leakage. In 1918 Kansas Experiment Station stated the manure waste for Kansas alone was $50,000.00

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BALANCE SOIL RATION

Farmers generally understand that manure of the various character, fertilizes and increases the yield of crops where it is applied. At the same time there is a large body of our general farmers who are only but little acquainted with the necessity of balancing the ration fed to the soil.

About a third of a century ago when the Swineherd was in its youth, under my care, similar conditions existed with farmers relative to balancing the rations fed to the pigs. It was known corn and milk was better than corn alone. The right proportions of each for best results was not understood by the general farmer. A great many old time farmers believed there was no better hog feed than corn, either to grow or fatten the porkers. It was a great shock to them when a professor of an Agricultural College announced in a publication of which he was the author that the general feeding of corn as the exclusive feed to his hogs, was wasting one-fourth of the corn eaten by them as it was not assimilated. It is now figured out just how much protein, carbohydrate etc. is required in the feed that is necessary to build the hog with the greatest success.

In feeding the soil it is necessary to know just the character of feed the soil contains and its condition. Or one might duplicate what the soil already had enough of and you would then be wasting your fertilizer.

This is causing a widespread demand from counties and sections of the various states for surveys and analysis of their soil from the Agricultural Colleges. These institutions are of greater value daily almost to the farmers. When the soil is analyzed, the fertilizer required to increase the yielding power of the soil can be selected and obviate the wastage.

MUST FEED TO GROW OR WORK

The horse, the cow and the pig,
Need care and feed growing big.
The hen eats all through the day
Required in her work to lay.
While the turkey, duck or goose
Takes daily feed to produce.
Farmers now are getting wise
Feed the soil to fertilize.

METHODS OF SOIL IMPROVEMENT

Diversified farming is a worthy aid and helpful in maintaining and improving the soil. This is general farming with livestock, cows, hogs, sheep, horses and poultry with pasturage and forage, clover, alfalfa and other grasses, rotating corn, oats, wheat and other grain crops. Crops with the exception of wheat is fed upon the farm.

This will by care and use of the homemade manure very largely maintain the farms' productiveness. The legumes of some character should be grown upon the farm. They serve two purposes, splendid food for live stock, and nourish the soil in the nitrogen drawn from the air.

To fully maintain and improve the fertility of the soil, commercial fertilizers are necessary to supply that which is needed as shown by survey and analysis. To secure the larger and heavier yields exacts besides the fertilizer, proper tillage and cultivation.

Rotation of crops has proven helpful in enlarging the yield of the soil. There are differences in the crops used in rotating, which will be discussed in next issue of the "Soil Improver." Another feature of crop rotation is that it is helpful in checking plant diseases, and heading off to some extent injurious insects damage.

Treat the soil fair by using selected choice perfect seed to increase the yield and aid the fertilizer as does proper tillage, these requirements are only reasonable.

DOUBLE BARREL LEGUMES

Alfalfa and clover are the two principal "legumes" which are grown the most extensively by the farmer over the largest scope of country of any other single legume. They are both exceptionally good hog feed, either as pasture or hay, and when nicely cured retain their bright green color when dried. They are the cheapest hog feed and live stock feed you can raise or buy when used with and balanced by a grain ration. They thus bring down the average of the whole feed. Therefore no farmer who can grow them on his farm should be without them.

There is another reason besides their feed value why these legumes should be given a firm foothold on the farm, which is their fertilizing character. They draw from the air nitrogen, which the soil is thirsting for, and thus replace that which the crops grown upon it are constantly draining from the fields and manipulating it into plant growth. If this fresh amount was not furnished, it would finally exhaust the soil's supply and thus impoverish it.

The history of these legumes and their self-support of the soil by furnishing nitrogen would prove interesting reading. The nodules on the roots of the alfalfa and clover are the attracting power drawing the nitrogen from the air. The soil or seed is inoculated for best results for producing nodules in largest quantities.

All farmers, in self-protection, should make every endeavor to increase the fertility and yielding power of the soil. Make it your star purpose to raise two blades where one grew before and two bushels of grain in the place of one, enlarging the crop and therefore enhancing the value of your farm.

A good start on this line of farming is to introduce alfalfa and clover growing. You will thereby secure extra good hog feed and at the same time improve the yielding capacity of the farm.

MICHIGAN FOR ALFALFA

The report from the United States Agricultural department states:

The alfalfa area of Michigan increased over 260,000 acres this year, following alfalfa campaigns conducted last winter by agricultural extension workers in that state.

THE AMERICAN SWINEHERD

Pioneer Poland-China Breed Representative

The American Swineherd, founde in 1885, is a special advocate of th great utility breed of swine, the popularity of which is growing and spreading continually. It is the grea American breed of hogs, the superiority of which is outstanding.

The Poland-China breed of swin was originated to satisfy the deman of the feeder, packer and the consumer as the ideal American por hog.

The American Swineherd, while loyally advocating this model America breed, has supplied its readers regardless of their breed, valuable instruction on all questions concerning th manner most successful in breeding feeding, developing, handling and caring from pighood to maturity. Thi management covered the purposes c the feeder whether the animal wa intended for the show ring, as breeder, or sale in the pork market.

The completeness and correctnes of this instruction has won for th paper the highest praise from breeders of the other breeds; many o whom have been continuous subscribers for years.

This high appreciation of the valu of the American Swineherd, as a adviser and instructor on all question pertaining to the hog, earned the titl for the paper of "Cheapest Exper Help You Can Hire."

There are also a goodly number o parties who have attained success a breeders, some as winners of highes show ring prizes, and others who were able to pay for their farm homes raising for pork market, who have acknowledged that they owe thei success to the excellency of the Swineherd's teaching.

Every farmer who raises hogs eithe as a breeder or for the pork marke will find the Swineherd a valuable aid and it will save him money and be a good paying investment. Many have written they got information out of a sample copy worth more than the year's subscription.

The subscription price is one dollar a year and a copy of the "Hand Book on the Sow" is given as a premium. Hundreds have written that the premium was worth the dollar. One man in Texas wrote he would not take $5.00 for his Hank Book on the Sow, if he could not get another copy. Or for $2.00, four years' subscription is given and the premium.

There is a strong inducement at this time for every farmer that has not pure bred swine to change for a double benefit. In the first place, a thorough test by the United States Department of Agriculture has shown that pure breds for pork purposes make 38 per cent greater profit for the feeder than the common hogs. In the second place, the pure breds can be purchased at the present time at prices that are very reasonable.

Pure breds should be adopted as matter of economy and profit by every farmer. Write for sample copy of American Swineherd, 320 Old Colony Building, Chicago, Illinois.

BAYNES' SOIL IMPROVER

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For 38 years Editor of "American Swineherd"
Chas. S. Irons - - - Manager

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FIVE YEARS ONE DOLLAR
Advertising Rates on Application

"Make two blades grow where one now grows"

EDITORIAL

THE HONORED FARMER

The Bible teaches: "In the beginning God created the heaven and the earth." Man was thus honored by the Creator in developing and providing the earth with growing herbs, grass, grain, fruit and live stock, as a well fitted dwelling place. After which mankind was created and given dominion over the earth and all living things on the earth and in the sea.

The soil, which coats the earth's surface, required ages to perfect, with the elements of nourishment for plant growth in establishing its fertility. The soil is the vitality of the farm, its fertility determines its productive value.

Farming is the world's primary industry; it is indispensable in sustaining the lives of the people, and its success perpetuates the nation's existence and glory.

Rome established the world empire through her high agricultural attainments. Becoming pompous and choosing a military organization to expand her power and neglecting agriculture, caused a high authority to state, "The chief factor in the fall of Rome and the Roman Empire was the impoverishment and exhaustion of her soil."

The farmer engages in a most worthy effort in his work to produce the bread, that the countless millions of people daily entreat their Heavenly Father to provide.

The farmer's work requires the exercise of mind and muscle to attain distinction in maintaining and improving the fertility of the soil to yield the largest annual crop dividends.

Owing to the improvident manner in which many of the early occupiers of the farms treated the soil, in using its fertility without recompense, much is now weakened or exhausted.

We are therefore compelled to adopt progressive methods of farming to restore the soil fertility and increase its productiveness.

Through the United States and State Agricultural Departments and the Agriculture Colleges' and Experiment Stations' research of Nature's laws, put to practical experiment, will give scientific, up-to-date methods to successfully restore the soil's fertility.

The "BAYNE'S SOIL IMPROVER" will keep in close touch with these public institutions, whose work is for the welfare of the farmers of the United States. This matter will be reviewed in our columns from time to time for the benefit of our readers.

We will have articles from farmers of prominence who have made a practical success in redeeming and maintaining the fertility of the soil of their farm in producing large crop yields.

This is an age when proficiency counts in farming for success. The fertile soil must be supported by competency throughout. Pure bred livestock and choice select seed for high quality, and adopting the best labor saving machinery and methods to insure production at lowest cost.

We hope to see the American farmer make himself the world's greatest, wisest and richest agriculturist.

EDITOR'S EXPLANATION

Upon the editor disposing of his interest in the American Swineherd recently, which he had edited for 38 years, upon being released therefrom, was very kindly advised by a number of his appreciated friends scattered over several states to take a well earned rest.

Hence an explanation is due. These earnest friends were so solicitious for our benefit and ease in our seeking a rest, that we looked upon it in contemplation as something excessively enjoyable and truly delightful to result from their favorite prescription of rest.

The 38 year tour with the Swineherd was not wearisome, but was relished, and there did not appear any demand for a greater rest than we received in the work.

We have to admit, that our strenuous endeavor to obtain the soothing balm of rest, by having nothing to do, was found before the first month was half through the hardest work we had ever attempted to do. We arrested the effort at once, to seek rest in a different channel.

We have for years fostered the hope that we might at some future time have the pleasure of editing a paper specially devoted to the interests of the soil as the foundation rock of agriculture and steadfast support of life.

Hence we introduce "BAYNE'S SOIL IMPROVER," with the mission to aid the work of placing the soil of the farms on the model productive basis, as presented by our Benevolent Creator. This is a big field for work and we believe all assistance will be welcomed from those whose hearts are in the work, loyal to the farmers' interests.

Since 75 per cent of the farms are not producing one-half the crop yield that the highest are, shows conclusively that the great majority will be glad to accept explanations and help to overcome the hard places.

We make no vain boasts of ability but we have experienced great changes in the methods of farming since our first holding the plow handles 70 years ago at 13 years of age. We are perfectly willing to leave it to our readers to be our fair judges. It is our honest conviction that every lover of a farm after reading "BAYNE'S SOIL IMPROVER" six months, will truly appreciate the paper and its work. The subscription price is made so low it will be virtually a gift.

OHIO CORN SCOUTS

A company of enterprising and ambitious Ohio farmers have enlisted in the "One Hundred Bushel Corn Club of Ohio," and have by their skill and bravery won the victory of accomplishing their laudable purpose.

This is a victory not only for these farmers, but for the state and for agriculture as a new discovery. It will create in other states a feeling to make efforts to show what they can do.

We say, all honor to the club, it has set a worthy example for others to follow. It will be as great an advertisement for Ohio as the ton litter pig club was for Indiana. The greatest yield of the individual in the club is 134.31 bushels per acre, which is claimed to be the world's highest published yield.

It is human nature to love a contest, and it is wise to promote them for such a meritorious cause. We understand the Ohio Agricultural College has the honor of fathering this contest. We have received from the College of Agriculture, Department of Soils, a record of the 40 individuals who are located in 26 counties of the state and giving the data relating to the planting, cultivation, manure or fertilizer if any, etc., etc. Which we will review in our next issue.

This contest discloses another important feature. That while the 40 contestors averaged over 100 bushels to the acre, the general average for the state was 40 bushels. This is less than half the club average. Of course, there must have been a very large number whose yields were under the average of 40 bushels.

The club men can take care of themselves, but those weaker ones need help. It is the soil fertility that produces the good crop yields. This is the help the "BAYNE'S SOIL IMPROVER" is ready to do, we can take care of the low average farmers of the state and show them how to increase their yields to raise the state's average to 50 bushels. If you wish us to help you over the hard place let us hear from you.

Of course, we shall appreciate the subscriptions from those who are among the successful farmers whose knowledge enables them to raise the good yields.

In our many years of experience we have a great number of the most successful ones, who have confessed that there was a time when they thought they knew it all; but since they have more than doubled their store of knowledge, they realize there is so much to learn they are anxious to draw from every source available and especially where they can get a year's stock for a quarter.

"Tell me, will it be an offense if I catch a fish in this pool?"
"No. It will be a miracle."

WHAT IS INTENSE FARMING?

A subscriber for the Swineherd asks this question of us. As the hog figures prominently in intense farming, we shall take pleasure in giving our subscriber a brief description of what "intense farming" means.

Intense farming is "making two blades of grass grow where one blade grew before." It is making ten pigs to a litter, where three to four were the rule previously. It is causing the farm to produce double the profits of the ordinary way of farming. It is dividing the old farm up between two sons and a daughter and making each of the three farms to produce more than the whole heretofore. It is doubling the profits of the farm and increasing the privileges of the farmer and his family. It is caused by the farmer using his brains to assist his muscles, in solving and working out for the best results. It means diversified farming and specializing in farming.

It puts the farmer in a higher class; it makes him a professional man. It is progressive and aggressive. "Intense farming" requires intense thought, specialized and confined upon your subject.

PURE BRED SEED

The improvement of the seed by selecting and culling both grain tubers and plants should be executed by every farmer. This should be done to give the soil an aid in enlarging the yield, and also establish a permanent improvement in the species.

There are opportunities in this line for many young, enterprising, ambitious farmers even up to the editor's age to win fame and fortune on one of these lines.

Don't be too modest or scared to progress.

THE NEW ERA SOIL CLUB

We invite every farmer who is a lover of the farm, and whose interests and affection for his farm home are entwined around his heart, whose farm is so near and dear to him that he is anxious and eager that it shall have such a treatment as will be relished by the farm because of the benefit to it, to be a member of this club.

Here is your opportunity to fulfill your fond wish by joining The New Era Soil Club. The soil is the heart of the farm. When it is in a good healthy condition, as our Benevolent Creator intended, its function is to give life, and nourishment to grow plant, herb and grass, which develops grain, fruit, tubers, etc.

The human food dependence is on the health and strength of the fertility of the soil. By nature the soil requires elements to transpose into the life and promotion of the growth of plants and herbs. If the soil is used to grow crops, they draw upon these elements until they are exhausted; if the elements are not replenished to keep up the fertility, it is like a locomotive that has the power to run while the fireman shovels in the coal and keeps steam up, but if he stops the engine quits.

The subscribers of the "BAYNE'S SOIL IMPROVER" will all have a free membership in this club. They will have the benefit of all the best scientific discoveries made by the Agricultural Colleges and Experiment Stations. Also they will have the rich valued experience of the genius born farmer, whose shrewdness and sagacity has prepared a method of treatment of feed for the soil to enrich its fertility and increase its yields, who will tell us how he did it. This club will not be confined to one variety of the many crops, but embraces them all.

The subscription price of the "BAYNE'S SOIL IMPROVER" is virtually so low it seems almost like a gift. If you want to make yourself glad for a year subscribe at once.

THE LEADING DAIRY STATE

The State of Wisconsin is the leading dairy state today in the United States; fifty-three years ago a great body of her farms were in a deplorable state, they had been enslaved to continuous wheat raising for which there was a ready market. The fertility was thus sold in wheat. The sons of the farmers and many of the farmers themselves were leaving the state and going west to new territory to secure farms. At this time, W. D. Hoard wisely realized the condition and visioned the remedy to redeem the fertility of the farms through the dairy. To promote this the "Hoard's Dairyman" was originated as a specialist for the dairy department of agriculture. He not only made the dairy a success and the farmers prosperous in the state, but the people of the state, recognizing his marked ability and the superior service he had rendered the state, honored him by electing him governor of the state. The state is still profiting today by the truths taught them a half cenury ago by W. D. Hoard through the columns of the "Hoard's Dairyman," which is still faithfully serving the dairy interests through his sons.

We have conditions today in Agriculture that calls for a specialist on the SOIL, the soul of the farm. The "BAYNE'S SOIL IMPROVER," loyal to the farm interest, will give you faithful service.

THE FARM TREASURE

The real farm treasure is hidden in the soil and there are only two ways for it to be taken from the soil.

The natural way to lose its treasure (fertility) is in being absorbed by plants for nourishment to growth and development. The plants feed upon the elements that constiute fertility and the continual sucking of the plant will exhaust the fertility of the soil unless fed to keep up the production.

There is no difference in the farmer's duty to be successful, between feeding his live stock and feeding the soil. Both need this attention to keep them in a healthy productive condition, and if neglected it will result in injury either to live stock or soil. The soil feeding can be annually, while the animals is a daily necessity.

The second way in which the soil loses its fertility is by erosion, washing by rainfall carries it off. Especially on rolling, hilly ground that is cultivated. Keeping a good sod on is a great help in saving it.

Keep up your soil's fertility th same as you would your bank ac count that you check upon, and kee them both good. One keeps up you credit, and the other the farm' credit. It is a paying proposition t be watchful of both.

FARMING METHODS WRONG

The farming as practiced by a larg percentage of those engaged in th work is deficient, as is shown by th results.

Take ten per cent of the farmer who have the highest yields per acr of crops in a state. The average yiel of this ten per cent will, in most cases be double the average yield of the 9 per cent balance of the farmers. Thi is proof there is something wrong with the farming methods of the bi majority.

Our mission is to show the grea body of farmers the cause of thi big difference in yields and the prope remedy to rectify it. In years pas in a number of the western states a gradual yearly decline occurred i the average yield of the crops. It i known that the crop is supported an grown by the elements in the soil which is called its fertility. The richer and stronger the fertility the greater the yield.

It is further shown where the soil is drawn on each year to nourish and grow a crop, it will finally exhaust the fertility and the yield will dwindle down until it will fail to pay for the labor.

This shows the necessity of feeding the soil to maintain and increase the fertility. This is the "BAYNE'S SOIL IMPROVER'S" work to show how this fertility can be maintained and improved in the cheapest and best manner.

We want this big majority of farmers to take advantage of this schooling at 25 cents a year. Start at once, you won't want to miss an issue.

THE LEGUME ERA

The United States is right at the peak now of the legume era. Their popularity is at its height up to this time, with the appearance of still continuing upward. It is found to be one of the cheapest processes of improving the fertility of the soil through the growth of legumes. It is advised by the Federal and State Agricultural Departments, the Agricultural Colleges, Experiment Stations and farm papers, which is a force that will extend its adoption universally.

In the editor's early days we grew on the farm in 1850, red clover as a valuable hay crop and for pasturage. It was used also as a fertilizer by plowing under for a summer fallow.

The special value of clover to the soil was known to the general farmer by the results from experience. The true causes of its aid to the soil may have been known by a few scientists, but this was years before the existence of Agricultural Colleges and Experiment Stations. The list of legume plants, transporters of nitrogen from the atmosphere to the soil, were but

w. Their special service was not derstood by the farmer.

The introduction of alfalfa was the eatest addition and benefit to the gume age and a strong leader of e legume plants of which there are ow many. For the ordinary farmer, falfa and clover are at the head of e column.

The condition of the soil of the rms are such that there is a demand r just what the legumes are best ble to supply.

The agricultural professors, editors d leading farmers all have their ats off shouting for legumes.

THE FARM BUSINESS

It is the business of every farmer o grow good crops upon his farm. His dependence is upon the fertility f the soil, it is the capital upon which e does business, and is the asset of he farm.

When we take into consideration he fact, that some farmers raise 80 o over 100 bushels of corn to the cre, while the general average of the armers in the same county or state aving an equal chance to do the ame, produce less than half the mount.

It is evident that the majority of he farmers are not using the proper method of keeping up the fertility of he soil. While the average is not equal to one-half the best crop yields, here must be a goodly number far below the average. We all want better yields and the only way to get them, is to improve the fertility of the soil.

The soil with its fertility exhausted, is like a bank without funds. This is occasioned by the crop that is grown upon the land, drawing on the elements that constitutes the fertility of the soil, to produce the crop. If the soil is not supplied with manure or matter that forms a fertilizer to replace that used in making the crop, the soil will grow weaker with each crop yield. This, therefore, shows the vital necessity and urgency of building up the producing asset of the great majority of our farms.

The "BAYNE'S SOIL IMPROVER" will be an earnest helper, loyal to the farmers' interest, in bringing about this betterment of their farms.

The Agricultural Departments of United States and of the states, together with the colleges and experiment stations are by their researches and experiments furnishing information of a scientific order of great agricultural value.

The "BAYNE'S SOIL IMPROVER" will keep in close touch with these agricultural departments and institutions that are developing progressive methods of improving and maintaining the fertility of the soil to largely increase the yields of various crops.

We will keep our readers instructed in the best practical methods of using the information that has been tested suitable for the different conditions of varied localities, etc.

We will also give the experience of successful farmers, saving and handling home made manure, for the greatest benefit in building up fertility of the soil. Also the great advantages accruing from growing clover, alfalfa and other legumes as a fertilizer will be shown. It is claimed that every up to date farmer now is a believer in and raiser of legumes. It acts as a two edge sword, food and fertilizer.

It is shown when the fertility of the soil has been reduced by continuous cropping without fertilizing there is nothing for the plant to feed on for its growth.

To restore strength you feed the soil manure or other raw material, which goes through a process of decaying, changing the texture of the material. Soil rotting is soil digestion and prepares the elements for assimilation and fertilizing fatness of the soil.

For a proper treatment of the soil there should be a survey and an analysis of the soil, to show what its deficiencies are, and what is needed. In supplying chemical fertilizers you can fill the prescription then without adding something not needed.

DON'T BECOME FLURRIED

A farmer in the middle west who has been engaged in a very ordinary manner of farming for fifteen years in the rut worn by his father, has become alarmed at the gradual decreasing yields, asks what to do.

It is all right to awaken, when the real life and value of the farm is slipping away from you, to use your mind to save it. But do not become agitated and vexed as it does not help produce your best thoughts.

Be cool-headed and survey the conditions, calmly, and it will be shown that the elements that produce the yields of plant growth and grain from the soil have been drawn on without any replenishing or feeding. In a natural state the growth of product would drop on the ground and decay, this charged with the nitrogen taken from the atmosphere would enrich the soil or at least maintain and add to its producing power.

Where the growth of products are removed from the ground upon which they grew, and no other soil food supplied, as a fertilizer it is a constant drain upon the yielding power of the soil.

This procedure can be continued until the land would be impoverished and barren.

The farm that is approaching this state of unproductiveness should be attended to and this party asks what to do. The class of farming that would bring about this weakened soil, is usually accompanied with a short bank account, rendering it necessary to adopt economical methods in reversing and proceeding on the road to replenish the fertility of the soil instead of depleting it.

Every farmer, even those financially able, should care for and save all the home made manure possible. Many poor farms, the manure is permitted to lie in a barnyard where it is rained upon and its value largely soaked from it. It should be kept in the dry, if not spread immediately out on the field you intend to fertilize. It will surprise you what a crop of manure you can scrape up when you make an effort.

The farmer who is in the condition of this party, should diversify with cows, hogs, sheep and horses, and thus feed most of the product on the farm. He should also use clover, alfalfa, soy beans or some legumes to draw nitrogen from the air from which the supply is unlimited and therefore one of the cheapest. In many soils clover and other legumes need lime to sweeten the soil to greatly increase their growth. Do not be impatient and worry, because you fail to understand the chemistry of the soil and the whole lesson at once. BAYNE'S SOIL IMPROVER will give you information in monthly meals.

The time is approaching when all the farms (as part are now), will be analyzed at the states cost, and it will be known what there is a deficiency of, which can be supplied by balancing with the elements lacking.

It will not be long after you get started on the road to build up the soil's fertility that you will progress rapidly in the fertilizing problems and feel and see the benefits of it individually.

WORN OUT FARM TONIC

The old farm that has furnished a good living for the family a few generations back who occupied it, but by poor farming its yield of crop has annually grown less, caused by its weakened fertility. The soil finally became exhausted of its fertility by the neglectful farm method of failing to supply the soil with nourishment to strengthen its fertility, thus stupidly violating a law of nature.

This once productive farm became so weakened it could not support the family occupying it, was deserted as a worthless wreck. There have been cases of this character, that have been redeemed and restored, to a healthy productive farm.

The strengthening tonic used was clover, lime, good tillage, manure and fertilizer from wherever you can get the kind needed. Have a few cows, make corn silage, sow rye for early and late pasture, it grows on weak soil, cow peas, soy beans and alfalfa will aid in the work. Plow crops of clover under, feed everything grown on the soil back to the soil. Buy bran and shorts for cow feed and help make manure. Have a few good sows, they produce two crops a year and co-operate with the cows.

There is no place on the farm for a lazy man, and success comes with good thinking as well as work. Use good, sound, every day horse sense, mixed with an equal quantity of perseverance and patience, rotating your crops, reading each issue of "BAYNE'S SOIL IMPROVER" and in five years you will have a famous, revived, highly productive profitable farm.

FIRST FARMER

"The first farmer was the first man, and all historic nobility rests on possession and use of land."—**Emerson.**

OHIO'S CALL

A shout in unison booms,
Double our crop of legumes.
It will show us to be wise,
Save labor and fertilize.

A SERIES OF BENEFITS FOLLOWING THE USE OF GYPSUM ON ALFALFA LAND

By Professor G. A. Olson

When I succeeded in growing four tons of alfalfa where only two tons had been grown previously, I accomplished the same thing as making two blades of grass grow where one had grown before. This was in the year 1911 and was accomplished as a result of applying gypsum to the land.

The next year the returns were about as good as those obtained in 1911, and in 1913 the producing power of the soil declined to normal. In other words I found that an application of 200 pounds of gypsum supplied only enough sulphate sulphur to serve the plant needs for two years, and in order to maintain increased production further applications were necessary in the fall of 1912 or in the early part of 1913.

In another field gypsum was applied at the rate of 300 pounds per acre and its effect lasted three years. Thus I learned that 100 pounds of gypsum would last about a year. The yields in the second field were considerably better than in the first, since with each succeeding year the yields increased. There was also noted a wide spread between the normal producing power of the soil and that following the application of gypsum. In fact, three to four times as much alfalfa was produced as before.

An analysis of the alfalfa showed that the gypsum had caused the formation of more protein than was present in the untreated alfalfa. This finding clearly showed that the gypsum had improved the feeding quality of the alfalfa.

Analysis also showed that there was much nitrogen in the soil where gypsum had been applied as where the plants were grown normally. This finding was also interesting because it was evident that the soil had not suffered as a result of increasing the yield of alfalfa. The increased protein content of the gypsum treated plants was therefore the result of taking nitrogen out of the air. In other instances the nitrogen content of the soil was increased, thereby augmenting the supply of nitrogen for non-leguminous crops.

Incidentally the organic matter content of the soil was increased through enhanced root growth. As a result the soil improved in mellowness and showed very good absorption and retention for moisture.

The farmers who first watched this experiment are now advocating the growing of alfalfa or red clover since with the use of gypsum they figure that they are making more money than during the period when much of their time was devoted primarily to the growing of wheat. It is also found that the wheat grown on alfalfa land is improved both in yield and quality.

In the space of ten years much of the wheat lands in the state of Washington have been converted into either alfalfa or clover lands. The only reason why all of the land are not fields of clover is due to scant rains in some sections. However, I believe that many of the farmers will succeed in growing clover where it was an impossibility previously. My reason for this belief is the fact that gypsum has increased the dry matter at least twofold, or in other words, one-half as much water is necessary to produce the same amount of dry matter as was previously required.

While a large portion of the wheat farms are gradually changing to lands in clover the farmers are gradually devoting more time to raising stock. It is estimated that the stock raised on the farms will consume the greater part of the alfalfa produced. The augmented yields obtained make stock raising more economical than before, and at the same time the caring of stock is a process of saving most of the fertility of the soil.

The proposition is not to produce legumes exclusively, because such a system would be nearly as bad as trying to produce grain exclusively. The aim is to produce alfalfa, for example, for a period of five years, followed by growing wheat for five years. The plan applies also to the growing of other grains. It may be considered a rotation of legumes with grain. The organic matter and nitrogen added to the soil as a result of growing alfalfa makes possible the successful growing of grain. After five years of grain crops the soil is again in fit condition to support heavy crops of clover or alfalfa.

Obviously the practice followed is successful because farmers find that five years of alfalfa growing favors production of as much wheat as was obtained in ten vears without the growing of alfalfa. The direct feeding of alfalfa on the farm adds to the revenue because by so doing the time for purchasing fertilizers is indefinitely postponed.

It is my belief that a similar procedure can be made more general. To accomplish this it will be necessary to devote our best efforts to making our farms occasionally, at least, lands in clover. Success in growing grains will follow without the necessity of loading the farms with artificial fertilizers.

THE EARLY SOIL BANDIT

He selected a farm just right to produce good crops. It was stocked by nature's laws with the soil elements to grow large yields of grain and there was a temptation to take what looked almost like measuring out of the soil cash with but little effort to produce. The product could be turned into real cash by hauling to the elevator at the railroad station. There was nothing given the soil in return for its work to yield, which was unjust treatment. This imposition on the soil was repeated yearly for a number of years, the crop growing smaller and soil weaker each year, until the yield in some instances was as low as four fold, the seed not paying the cost of the labor.

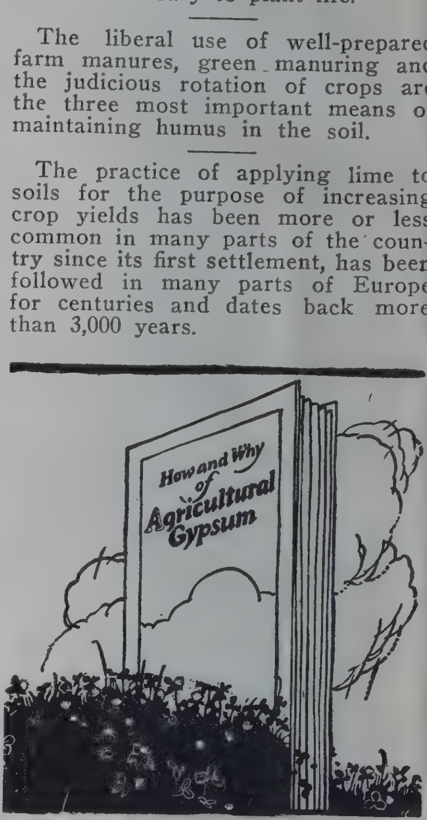
This unfair farmer having abstracted the kernel from the soil, then sells th shell, for what it would bring an moved west to get another nut t crack. These practices by some o the early settlers are long since ou of date, but there are some of th crippled farms remaining, that nee restoring to health.

There are some smart persons wh pick up one of the weakened soil farm at a low price and with clover an lime or other fertilizer make a healthy producer out of the place and a desireable home.

Carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, iron potassium, calcium and magnesium are all necessary to plant life.

The liberal use of well-prepared farm manures, green manuring and the judicious rotation of crops are the three most important means o maintaining humus in the soil.

The practice of applying lime to soils for the purpose of increasing crop yields has been more or less common in many parts of the country since its first settlement, has been followed in many parts of Europe for centuries and dates back more than 3,000 years.


How and Why of Agricultural Gypsum

Send for This Free Book

Practically every farmer in your territory is beginning to appreciate the value of Agricultural Gypsum in obtaining a heavy growth of clover, as indicated on the left side of this picture. Agricultural Gypsum is also worth many times its cost as a preserver of nitrogen in manure. You have a fine opportunity to sell Agricultural Gypsum at a good profit. Write us for full details and also for a copy of our free illustrated book.

The Gypsum Industries

Dept. 112—844 Rush Street

Chicago, Illinois

HOW FORTY OHIO FARMERS GREW OVER 100 BUSHELS OF CORN PER ACRE

—From Department of Soils, The Ohio State University, Circular No. 59, April, 1923.

The ability to grow high acre yields of corn is a commonly accepted criterion of a man's skill as a farmer. Many Ohio farmers are now attempting to reach the laudable goal of ,000 bushels of corn on 10 acres. In his their incentive is not entirely one of satisfaction to be gained in accomplishment. Numerous costs of production surveys in the Central West have shown that high yields are very generally associated with low costs of production. Most farmers recognize that a majority of the items of expense involved in growing a crop are the same whether the yield is high or low. They also appreciate the need for increasing the acre yields of all crops if profits are to be realized under conditions of steadily increasing land values. To raise 100 bushels of corn per acre in most parts of Ohio requires strict attention to all the details of science and art involved in corn growing.

It Has Been Done

For the past six years the average corn yield in Ohio has been 40 bushels per acre. During the same period, 40 farmers in 26 different counties have produced more than 1000 bushels on 10 acres. A few of these men have exceeded 100 bushels per acre in four years of the six, and several more have averaged this amount for two or more years. It has been done. Perhaps the means by which it was accomplished will be of use to others who desire to raise their yields of corn to a higher level. The following is a summary of the more important phases of the systems of soil management followed.

Clover was the preceding crop on two-thirds of the fields. One-half of the fields were manured previous to plowing for corn. Two-thirds of the fields received commercial fertilizers in amounts varying from 100 to 1000 pounds per acre. Half of them received acid phosphate alone. One-third received manure with acid phosphate. In all cases except one, where the yields have exceeded 114 bushels, a phosphoric-acid and potash fertilizer was used and in this case 80 tons of manure were applied on the 10 acres.

Gilmore's World Record

In 1922, Mr. William H. Gilmore, of Licking County, produced 1343.1 bushels of corn on 10 acres. This is the highest recorded yield in Ohio, and at present stands as an unchallenged world's record. In order to secure this yield a red and sweet clover sod was plowed down, five acres of which had received 20 loads of manure. An application of 500 pounds of 18 per cent acid phosphate per acre was made on the 10 acres. On the 5 acres receiving no manure, an additional application of 500 pounds per acre of a fertilizer containing 10 per cent phosphoric acid and 10 per cent of potash was made. The corn was planted in hills 36 by 33 inches, averaging 3 to 4 stalks per hill. It received two cultivations. It is estimated that the total cost of production and harvesting did not exceed 38 cents per bushel.

To Mr. Gilmore this is the realization of an ideal. For many years he has been building up the fertility of this soil and increasing his yields. He has done this by thorough tile drainage, by using manure and fertilizers, growing legume crops, and planting well selected and tested seed. With this system of fertility practice, yields of over 100 bushels of corn have been secured on 10 acres three times in the past four years. The average yield per acre on his 10-acre plots has been slightly over 110 bushels per acre.

Johnson says, "Sweet Clover and Phosphate"

High corn yields can be produced on grain farms where the supply of manure is limited by plowing down legume crops for green manure. This practice has been demonstrated on the Johnson Seed Farms in Williams County. Mr. Johnson grows a large acreage of soybeans and is a firm believer in these and in sweet clover and acid phosphate for soil improving purposes. With the growing of soybeans for seed and the plowing down of sweet clover for green manure, it has not been necessary to add any fertilizer except acid phosphate, to secure a corn yield on 10 acres that has averaged slightly over 100 bushels per acre for the past two years.

Taylor Uses Acid Phosphate, Manure, and Clover

To manure and clover must go a great deal of credit in helping to produce high corn yields. On the farm of A. F. Taylor and Son, of Champaign County, the corn yields have consistently surpassed the 100-bushel mark, in a corn, wheat, and clover rotation, to which has been applied 9 tons of well preserved manure. The manure is applied either on the new clover seeding or on the clover stubble. Seven hundred pounds of acid phosphate per acre is divided between the corn and wheat. The use of well preserved manure produced from feeding grain, supplemental feeds, and clover, coupled with a liberal use of acid phosphate can be expected to result in the rapid movement of yields in the direction of the 100-bushel mark.

System in Corn Growing

There are many soils in Ohio upon which it is impossible to grow 100 bushels of corn per acre the first year by any practical method of soil treatment. Usually the men who have attained this goal have been following a well-thought-out system of soil improvement for a number of years. That the methods have varied with different types of soil and different systems of farming has been shown in the preceding paragraphs. Spasmodic efforts are seldom highly successful. On the other hand there are probably but few soils in the state where 100-bushel yields of corn cannot be secured if preceded by the right soil-building program. This in most cases will include tile drainage, limestone, more legumes, and the liberal use of farm or green manures generously supplemented with high-grade commercial fertilizers.

An Ideal Rotation for Corn Production

A two-year rotation which is proving very popular in Illinois, and fast growing in favor in other parts of the corn belt is corn, wheat with sweet clover as a catch crop to be plowed under for corn. The entire fall and spring growth of the sweet clover is usually plowed down for the corn. In some cases the fall growth is cut for hay or pastured. This rotation not only builds up the soil, but gives a cash crop on each rotated field. Where a hay crop is needed, it is common to rely upon a permanent alfalfa field.

The plowing down of sweet clover for corn, supplies a source of rapidly decomposible organic matter, especially rich in nitrogen. Where properly supplemented with phosphoric acid and on some soils potash fertilizers, this system may be expected to satisfy the fertility requirements of maximum yields. A 100-bushel corn crop takes from the soil 150 pounds of nitrogen. The average soil in Ohio contains about 3000 pounds of this element in the surface soil of 1 acre. Only 2 per cent or about 60 pounds of this soil nitrogen, sufficient for a 40-bushel corn crop, can ordinarily be utilized by the crop during any one growing season. Obviously, if 100-bushel yields are to be grown on any but exceptional soils the natural supply of soil nitrogen must be generously supplemented with nitrogen from other sources.

The Illinois Station found as an average for 9 experimental fields, that the spring top growth of sweet clover, sampled about May 1, contained 135 pounds of nitrogen per acre. When it is considered that they estimate an equal amount of nitrogen is contained in the roots at this time, it is not surprising that they report consistently better corn yields where sweet clover is plowed down than where farm manure is used in liberal quantities.

Success with sweet clover demands plenty of limestone, phosphorus, and thorough inoculation. The latter is seldom obtained until the second time the crop appears in the rotation. Hence when trying this rotation for the first time, it is well to seed a mixture of sweet and mammoth or alsike clover.

Regulating the Climate

It takes the right kind of weather to grow good corn. An abundance of rainfall properly distributed is of first importance. Plenty of water is especially needed during July when the corn is making its most rapid growth. In fact, over a period of years the yield of corn in this country has gone up and down almost exactly with the July rainfall. The effects of dry weather are most serious on soils of low fertility or those in poor physical condition, due either to a lack of good drainage or sufficient organic matter. On the heavier soils tile drainage is absolutely essential as a means of regulating the water supply and the temperature of the soil. On such soils drainage may appreciably lengthen the growing season for the crop by permitting the land to be prepared for seeding earlier in the spring. At Wooster, corn planted the first week in May, has yielded 24 bushels more than corn planted the first week in June, as an average for 8 years.

Building up the organic matter content of the soil by incorporating manure, crop residues, or green manures, may be expected to assist materially in holding sufficient water in the soil to prevent drouth injury. At the Ohio Station the manured plots have consistently shown larger yields relative to the untreated plots in years of drouth than in favorable seasons. Plenty of humus in the soil takes a great deal of the speculation out of raising crops. Weeds cannot be tolerated if maximum corn yields are to be expected. They rob the crop of both plant food and water. Thoro cultivation with liberal use of the spike-tooth harrow or weeder early in the season and shallow cultivation later, is accepted good practice.

Poor Seed Worse Than Poor Soil

Good soil, good drainage, the proper fertilizer, a well prepared seedbed, and an ideal climate with an adequate storage capacity for moisture will not guarantee maximum corn yields if good seed is not planted. Best results are secured by field selection of well developed ears from good healthy stalks, avoiding those which show premature ripening. The seed should be thoroughly dried before cold weather sets in and should be carefully inspected in the spring, discarding all ears which show the least evidence of disease, those which show starchiness, and those which are extremely rough and chaffy.

In the past, the tendancy has been to plant corn of the larger eared, late maturing varieties at the rate of three kernels per hill, from 42 to 44 inches apart each way. Maximum yields are seldom realized under these conditions. Where hill planting is followed, the better method, and the one that is gradually being adopted, is to grow three stalks in the hills, 36 inches apart each way and to plant a moderately early maturing variety producing medium-sized ears. This method gives about 14,500 plants per acre. Good evidence of the value of the latter method is found in Mr. Gilmore's record yield from something over 16,000 plants per acre.

E. P. REED

MORE LEGUMES

The Importance of Legumes in a Balanced Rotation

“Legume crops must be grown on the great majority of our farms if the soil nitrogen is to be maintained economically. This is not the only reason for growing legumes, however. In the corn belt, the cotton belt, and the wheat growing section of the northwest, where one crop is outstandingly more profitable than any other, the proportion of the crop area which is devoted to this maximum profit crop is usually very large—almost always too large to meet the requirements of a good crop rotation. The introduction of a legume crop into the corn belt rotation almost of necessity results in a considerable amount of diversification in the crops grown. It requires a small grain in addition to the corn crop. In the central and northern portions of the state, oats is the most common small grain, with wheat ranking second in importance.

“In actual farming practice the introduction of a legume crop into the rotation is an important factor in bringing about a reasonable amount of diversity, and a certain balance between the several crops which must be grown to work in satisfacorily with the legumes. The factors of diversity and balance are of importance in distributing horse and man labor evenly throughout the cropping season.

This means economy in the use of these two items which make up from 60-80 per cent of the total operating expense (excluding interest on the land or rent) in producing corn belt crops. Diversity and balance are also of importance because they help to avoid some of the risk necessarily involved in any type of farming in which one crop makes up a large part of the crop receipts. That is, the introduction of the legume, and the necessary change in the rotation accompanying it, helps to insure a constant income in the farming business.”
—W. F. Handschin, Agr. Uni. Ill.

THE STORED NITROGEN

The element nitrogen is a constituent of all protoplasm and is therefore essential to the building up of the cell. The sources of this element available for agricultural and other purposes are numerous. Of these the atmosphere is by far the most important and most extensive. Above each acre of the earth's surface there are about 34,000 tons of atmospheric nitrogen. This nitrogen is rendered available for agricultural and other purposes.

The free-living nitrogen-fixing bacteria are universally distributed. During the growing season where the soil is well aerated they are continuously adding appreciable quantities of nitrogen to the soil.

These organisms perform a highly specialized function which is in every respect beneficial to soil fertility. The nodules may be regarded as organs facilitating the absorption of uncombined nitrogen.

The legumes, alfalfa, clover and soybeans, are leaders in drawing nitrogen from the atmosphere to plant and soil.

PORTABLE CRUSHERS SOLVE LIME PROBLEM

“When a man has good limestone right on his farm, one of the most economical things he can do is to put in a portable crusher,” says Griffith Richards of the soils department of the University of Wisconsin.

“Especially when a farm is situated a long distance from the railroad station,” continues Mr. Richards, “is the idea a good one, for it saves that long haul.

“And when he has a little spare time, although most of them haven't found much of that lately, he can get some of the stone ground and have the material right there to put on his fields when he is ready for it.”

It was down near Fennimore that the portable crusher idea originated, relates Mr. Richards. The farme had difficulty in getting a good cr of clover. After the farmers in t neighborhood were convinced th only through the use of lime cou they grow clover and alfalfa succes fully, a Wisconsin manufacturi plant was persuaded to make a hand portable machine which would gri the stone right on the farm.

“It was quite by accident that t first one was placed in Green county Mr. Richards states.

“One of the college soils men w driving past a field one day, whe a farmer named Wm. Preston w working.

“ ‘That looks like a good limeston he remarked, pointing to an outcr near by.

“It was found to be good limesto and there was plenty of it. Short after a company of five or six far ers bought a portable crusher.”—W Agr. Col.

GYPSUM SAVES NITROGEN

Not all of the loss from barn-store manure is caused by leaching. N small part of it is occasioned by fe mentation of both the dung and t urine. The only remedy for this the use of a good preservative. T most economical preservative manure is gypsum. Various exper ments indicate that the nitrogen p served by gypsum, when it is proper used on manure, is worth at least tw times the cost of the gypsum whe both are figured at current mark prices. One dollar's worth of gypsu will preserve more than two dollar worth of nitrogen. Gypsum preserv the nitrogen of manure by transfor ing the volatile ammonia to non-vol tile amonium sulphate. The punge ammonia odor prevalent about stabl is evidence of the escape of ammon into the air. By applying fine ground gypsum to the manure at t rate of about three pounds per anim per day, this extremely annoying od may be destroyed and at the sam time the nitrogen, or a good part it, may be preserved.

FARMERS WHO TRY LIME CALL IT AN INVESTMENT

Twenty-five Clark county farme who have tried liming their soil ha decided that lime is an investment a not an expense. This farmer wh tried it the longest speaks for the all when he tells what lime did on h farm.

For twelve years he tried to bui up his soil by keeping cows and bu ing hay and feed just to make manur He used good crops, but could not g a good enough catch of clover to l it stand for hay. At last, even his co was poor.

In 1914 he tried one acre, plowing in the Fall, top-dressing lightly wi manure and adding two tons of t coarsest grade of limestone. The fir crop following (oats) did not show r sults, and a bad corn season the ne year cut down the chance of improv ment in that crop; but even the fir year the clover was fair and did n die out as that on unlimed soil did.

A second seeding of clover wi wheat for a nurse crop gave wonde ful results, says the farmer—whe early 30 inches high, and clover almost as high. When the clover was ut it yielded four and one-half tons, mixed clover and timothy.

Meanwhile another acre limed with wo tons of fine stone to the acre and pread with manure grew the best ats in the county and gave an admirble catch of clover. The better success with the fine limestone, in this armer's opinion, warrants its use everywhere instead of the coarse. The coarse lime is, in the end, effective, but it takes too long.—Wisconsin Agricultural College.

CLOVER RETARDS SOIL LOSS

Northwest Missouri Will Grow C'over to Save the Soil

A practical feature emphasized in he Clover and Prosperity campaign conducted in Northwest Missouri is the part that clover and crop rotations play in checking the loss of soil by washing.

Experiments conducted at the Missouri Experiment State show, according to P. F. Schowengerdt, soils extension specialist, that on a moderate slope where corn is grown continuously it requires only 52 years for the rain to wash away the entire surface soil, 7 inches deep. When corn is grown in a rotation with wheat and clover, on the same slope the life of the surface soil is lengthened to 253 years.

Much soil in Northwest Missouri is more rolling than that upon which this experiment is conducted, therefore the washing would be even more rapid. It is astounding to realize that with corn growing continuously the surface soil on a farm has to be lost entirely about every generation.

In this campaign, therefore, the slogan "Grow Clover to Make Your Soil Last Longer," will be used.—Mo. Bd. Agr.

GROW MORE SOYBEANS FOR FEED AND FERTILITY

"Soybeans, sir," replies George Briggs of the College of Agriculture to questions asked in many sections of Wisconsin about a crop which will build a better and more fertile soil.

There are ten good reasons why farmers in many sections of Wisconsin should try a limited acreage of soybeans. These are:

1. A majority of farmers in Wisconsin are having good success with them.
2. Soybeans are just a common crop for common people. It is not necessary to have a soil free from acid for good yields.
3. The best annual legume for medium to light soil is the soybean. It yields best on fertile soils, yet yields on light soils where other legumes fail to catch.
4. It is an annual plant—sureness of crop is a certainty.
5. The soybean is the dual purpose member of the legumes—an annual used as a green manure, silage, hay, seed and pasture crop.
6. In feeding trials, soybean hay is equal to alfalfa.
7. Soybeans take no more moisture when planted with corn than do weeds and the leaves make rich silage. The labor of caring for soybeans with corn is no greater than for corn alone.
8. Properly cured, the crop is relished by all stock.
9. Soybeans are easy to grow, as they are not attacked by any serious diseases.
10. Being a legume, the soybean builds up soil by adding nitrogen.—Wisconsin Press Bureau.

A NEW CORN CHAMPION

According to the Agricultural Extension Department of the Ohio State University, a farmer of Licking County, Ohio, William H. Gilmore, raised more corn last year, on ten acres of land than has ever been raised before. The record is official, having been made in connection with the annual 10-acre corn contest conducted by the university. Mr. Gilmore produced 1,343.1 bushels of air-dried shelled corn on his 10 acres, an average of 134.3 bushels per acre, 93.3 bushels greater than Ohio's average yield.

"Mr. Gilmore," said one of the university officials, "has averaged over 100 bushels per acre for three years, but this year made very special efforts to break all existing records. He plowed down a clover sod, half of which had been heavily manured, and applied 18 per cent acid phosphate at the rate of 500 pounds per acre. The five acres without manure had an extra 2,500 pounds of an 0-10-10 fertilizer. The seed was sown three feet apart each way and thinned to three stalks to a hill."—Nat. Fert. Assn.

CULTIVATE LESS ACRES—AND MAKE THOSE MORE FERTILE

Writing in the Southern Planter, W. H. Harrison, a farmer of Prince George County, Virginia, makes some remarks on corn growing which we call to the attention of our readers:

"Three-fourths of the farmers of the present day try to cultivate too many acres of corn. Just as much corn, if not more, can be made on one-half the acreage if we only make the land more fertile, prepare properly before planting and then cultivate properly. In this way, we will have only one-half the labor and expense. Nowadays most farmers have to do the largest portion of the work themselves, due to labor being so scarce and high and they must finally come to the above method of farming or else go to the poorhouse.

"For each crop of corn there must be an ample supply of plantfood provided in the shape of fertilizer or manure, and better still, leguminous crops. This is the only way to produce large yields per acre and to increase soil fertility at the same time.

"Ten acres of fertile land, well cultivated, will produce more than twenty acres of ordinary land poorly cultivated.—Soil Imp. Com.

ROTATION DOUBLED YIELD

University of Illinois Test

The system of rotation on adjacent fields at the University of Illinois changed the yield of corn from an average of 27.3 bushels to 55.6 bushels, while rotation and proper soil treatment increased it to 83.3 bushels. Officials declare the results sufficient proof that adapted rotations accompanied by proper soil treatment no longer can be neglected.

"Efficient crop rotations are recognized necessity if the Illinois farmer is to continue indefinitely on his farm," states J. C. Hackleman of the university.

"Our average yields are sinking to levels which make farm operations hazardous; the plant diseases are becoming worse each year on lands not rotated, and insect pests always follow and take the heaviest toll where the single crop system of farming is followed.

"In the establishment of a successful rotation, the following fundamental facts must be observed: Choose as succeeding crops those which use a widely different proportion of plant food materials; follow a shallow-rooted with a deep-rooted crop; change the type of crop as radically as possible, so as to give the least possible opportunity for the increase of fungus and insect pests."

ROTATION OF CROPS

Missouri Has One of the Oldest Experimental Fields

Rotation Field, one of the soil experiment fields at the Missouri Agricultural Experiment Station, was established in 1888 and has been operated continuously since that date with only minor changes in plan. It is one of the oldest soil fields in America. The chief problem which this field was designed to solve is the determination of comparative values of different rations when continued through a long period of years. It is found that the longer the period between corn crops the greater is the yield, varying from 20.9 bushels with corn every year to 32.6 bushels in a three-year rotation, 38.5 bushels in a four-year rotation and 41.5 bushels in a six-year rotation. At the end of 30 years the summary of results indicates that the four-year rotation of corn, oats, wheat and clover is a little the best of those tried. Money invested in fertilizers during a four-year rotation has yielded increased profits as follows: limestone 152%, bonemeal 397%, acid phosphate 362%, potash 46%, manure 220%.

The Experiment Station has issued a detailed report of the rotation tests, covering the work of 30 years. This is Station Bulletin 182. Missouri Agricultural Experiment Station, Columbia, Missouri.

Grain planted in drills is subjected to more even germination and regular growth and consequently a more uniform stand and higher yield may be expected than from broadcast seed.

A farm without live stock is like a ship without a rudder. Progressive farmers recognize their value to return to the soil that what has been taken from it.

You need limestone to neutralize the acidity of the soil, as most crops thrive best in neutral soil. Quicklime has the same effect, but can not be applied when growing crops will be affected by "burning."

THE COUNTY AGENTS PROMOTES AND GUARDS THE FARMERS' INTERESTS

The introduction of the County Agent, as an aid to the farmers of the County, in advising and instructing them, marked an important period of advancement in the farmers' interests and welfare. This trusted friend and agent has proven himself of the greatest utilty and usefulness, rendering valuable and needed service to the farmers of his county. His work establishes him as a real treasure to the farmer. The County Agent maintains a close relation with Agriculture Colleges and Experiment Stations, securing the benefit of their latest discoveries and improvements, while all knowledge gained by constant and persistent research is available to any of his farmer constituents.

The editor of this paper recognized from the first the urgent need and importance of the duties of this office, that were apparently waiting for the County Agent to occupy and perform. We have always been a strong believer in the wisdom of the adoption of the County Agent. This paper will gladly co-operate with them in forwarding the farmers' interests.

The story of facts of a daring, energetic farmer with but little capital buying a worn out farm for a small sum, mostly on time, and with fertilizers and labor built it up by enriching the soil into a productive farm, yielding good profitable crops, is highly interesting. This is the most impressive evidence in convincing others, that what has been done by one, may be by another. Send in some of the good things from your section for the "County Agent Page." No county can afford to dispense with a good County Agent; they are a regular posted Encyclopedia on matters concerning the farm and ready to help the husbandman on all occasions.

He is likewise the farmers' friend; he is virtually on guard day and night to protect the farmers' interest. He is the busiest man in the county and is constantly on the alert to stop some injury, or to secure some privilege that will be helpful to the farmers of the county. He picks up a good point and distributes it where it may serve many instead of one.

The County Agent organizes the farmers for selling their products of grain, fruit, vegetables, live stock, etc., etc., procuring better prices than were possible for farmers individually, and he saves in the expenses of marketing. The County Agent, by concentrating the orders for buying farm machinery, implements, feeds, seeds, fertilizers, etc., etc., can secure a pronounced saving for the farmers of his county.

The County Agent is comparatively a modern official and is such a profitable and beneficial help to the county that the wonder is he was not thought of before.

His duties require energy, enterprise, industry and ambition to have the farmers of his county keep up their county line of progress with the front of the advance. He will see that the scrub sires are changed for pure breds in cattle, hogs and sheep. This work will continue until the herds and flocks are all pure bred animals and scrubs will be not only out of commission, but out of sight and out of the country.

This progressive age supplies through the County Agent, Agricultural College, and Experiment Station, the farmers' scientific agricultural wisdom, and through the American Farm Bureau Federation the power that defends and enforces their rights and protects their interests from harm. The County Agent will continue to grow in efficiency and value. BAYNES' SOIL IMPROVER will be glad to circulate among the farmers' agents bright ideas which they can give us, without losing from themselves.

WELL WORTH KNOWING

It is a positive value, as one of the chief sources of furnishing organic matter to the soil, in corn raising sections to plow under the corn stalks; it is a waste and bad practice to burn them or sell them from the farm.

The home made stable manure has its greatest value when first made; the practice of applying it to the soil at the time of cleaning it from the stable is found to be economical and renumerative.

The legumes, alfalfa, red clover, soy-beans, cow peas, rape, sweet clover and others, should be grown on every farm possible. Besides furnishing splendid forage, it is their natural function to draw nitrogen, a most valued fertilizer, from the inexhaustible supply in the air; limestone is its helpmate.

Rotation of crops perform a service, but singly do not add fertility or an element of plant food to the soil.

The Agricultural Colleges and Experiment Stations are the fortresses that will safeguard and insure the productiveness of the futurity of the farm, upon which the Nation's progress and greatness depends

The "BAYNES' SOIL IMPROVER" will establish its true friendship for the farmer subscribers by carrying welcome messages of instructive value to them monthly. A response on the part of the subscriber with a club of eight neighbor farmers for a dollar for a year will be appreciated.

"Farming in the future will no longer be a matter of brute force. It will be a business for brains, organization, intelligence." Reads as if it were taken from an editorial written yesterday, or a speech by some extension worker out in the field. The quotation represents the vision of one John Skinner, editor of the American Farmer, the first edition of which appeared in Baltimore in April, 1821, just 102 years ago.

The old Romans knew a thing or two about agriculture. For example, they knew that legumes are great soil improvers.

WHAT TO FERTILIZE: THE SOIL OR THE CROP?

In the December 9th issue of Penr sylvania Farmer, Dr. J. G. Lipmar Director, New Jersey Experiment Sta tion, presented an interesting discus sion of this question—one which rightly receiving more and more a tention. Dr. Lipman looking at from the standpoint of the accumula tion of plantfood reserves in the soi shows that, while there is somethin to be said on both sides, the accumu lation of plantfood reserves is justifie only when it makes in the long run fo the most profitable returns and th conservation of land values.

Prior to the introduction of com mercial fertilizers, farmers generall fertilized the soil. Through the us of large quantities of animal manure composts, muck and marl, they bui up a reserve, not alone of total plan food but of circulating plantfood ca ital. Farmers now pretty generall recognize the wisdom of fertilizing th crop, and the development of and im provement in commercial fertilize has enabled them more and mo easily to do so. These very factor however, i. e., the concentration an solubility of commercial fertilizer m terials have not been without the disadvantages. Dr. Lipman recites an instance the all too common exp rience of farmers who, finding a mo erate application of acid phospha productive of larger crops, contin the practice until the crops beg markedly to decline. The solub phosphate, supplying a deficiency, h stimulated plant growth until a poi is reached at which the soil has bee mined of its nitrogen, potash and lim "The use, therefore, of any sing plantfood ingredient," says Dr. Li man, "while accompanied for a tim by profitable returns, ultimately lea to a decline in the productive pow of the land."

Thus, any long-time cropping sy tem to be successful must arrange maintain the fertility of the s against the inroads made by the crop and other factors, through the use commercial fertilizers and oth means of conserving and maintaini productivity. Whether it is advisab to try to build up a reserve in th soil is another question.

Briefly, there is sufficient eviden that it would not pay to replace the plantfood removed by crops wi commercial Fertilizers. Fertilizer N trogen does not accumulate in the s and should therefore be used only fertilize the crop, supplementing th supply of soil nitrogen. Any nitrog reserve in the soil will be in the fo of crop residues rather than fertiliz residues. Legumes maintain this trogen reserve. Fertilizer Phosphor acid and potash very often accum late in the soils, "depending on th intensity of the practice." The qua tities applied will determine wheth or not such an accumulation is ec nomical; generally speaking, the seems to be no logical reason, at pre ent at least, for the building up reserves through the use of comme cial materials. Adequate quantities the proper commercial fertilize should be employed as supplemen to other practices which will mai tain soil productivity.

THE LABOR SAVING AGE

There has been a continual advance in the cost of farm labor in the last fifty years. In our boyhood days on my father's farm, our hired men in 1850 to 1855, were regularly employed and boarded on the farm. The head man was paid $12.00 a month by the year, he fed, cared for the horses and drove the team of four horses, also during plowing and cultivating crop time he looked after and directed the other teams besides his. He worked for several years at this wage. The one below him received $10.00 per month and a lower one at $8.00, often a new arrival from across the water and required breaking in. This farm was located 18 miles from Philadelphia, Penn. It required 4 horses, a pair of mules and a yoke of oxen to furnish the farm power. The farm carried a dairy of 35 cows for butter, 40 to 50 hogs, and 50 to 75 sheep. The $10.00 man fed the cows, sheep and hogs, while the low priced one cleaned the stables. We boys milked the cows, fed chickens, etc. Haying and harvesting was all done by hand.

There has been for years a constant drain on the farm labor by the trades and other industries, higher wages being the inducement. While the cost of farm labor was continually advanced it did not catch up with the other lines, thus the attraction remained to deplete the ranks of those working on the farm.

The wages of the farm laborers have advanced more and held up better in proportion than the prices of products of the farm. These conditions rendered it necessary to help out the farmer by supplying labor saving implements and machinery. These inventions, manufactured for the benefit of the agriculturist, have proved a valuable asset.

They have not only lightened the farm burden and deprived them of weariness, but have enlarged the quantities of work that can be accomplished, lifting the agricultural industry to a higher and broader plane.

This is truly a progressive labor saving age, for all industries, as well as for husbandry. In a recent page advertisement of the International Harvester Company of America, in the American Swineherd, we counted forty-eight tillage implements and machines and only four of them were in use when the editor was a dirt farmer boy.

The aggressive and progressive farmer wisely adopts the improved farm utensils and machinery, that enable him to keep his tillage and all farm work up in due season. He therefore, has more time to use his mind in thoughtful planning to his advantage. It not only dignifies but pays as an investment.

A SAVING CLAUSE

"Pa, why is a wife called the better half?"

"In order, my son, that she may not get the impression that she's the whole thing."

WE WANT MORE BURBANKS

The Agricultural Colleges graduating through their schools and the practice through the Experiment Stations of the regiments of bright young farmer boys every season, it is only reasonable to expect that there will be some among them of the Burbank type. Burbank has shown what can be done by a genius of his order with plant breeding. We must have more of them even if we have to go to the Yankee regions for them; this work should be continued.

It may be that we will be compelled to grow a yearly crop of fuel or some new sort of fruits or food for human consumption.

The All-wise, All-knowing Heavenly Father left a multitude of problems for solving for the benefit of the human race.

ONE OF THE MEANEST OF LAWYERS

Young Man—"I should like to ask your advice, sir, as to whether you think your daughter would make me a suitable wife."

Lawyer (ironically)—"No, I don't think she would! Ten dollars for my advice, please."—Topics of the Day Films.

BADLY SOILED

We are asked what to call a farm, that has been worked until it fails to produce. We would call it badly soiled.

American Swineherd

The Pioneer Poland China Paper

with a record of 38 years successfully advocating pure breds on every farm offers you the best up-to-the-minute information for breeders, feeders and showmen.

The Cheapest Expert Help You Can Hire

Subscribe now at the special rate of $2.00 for four years with "Hand Book on the Sow" as a premium.

This little book is alone worth the price of the whole to you—one man in Texas wrote, "I would not take $5.00 for my 'Hand Book on the Sow' if I could not get another copy."

38% BETTER PROFITS *from* PURE BREDS

Read how to make more money with hogs in the American Swineherd. Subscribe now. Mention this paper when you write.

AMERICAN SWINEHERD, 320 Old Colony Bldg., CHICAGO

SOIL EROSION AND ITS PREVENTION BY TERRACING

Few people realize the extent of soil erosion and of the enormous loss of surface soil from the hillsides in farming districts. More than 400,000,000 tons of soil material, all unnecessary waste, is carried to the sea annually. This figure represents more dirt than was moved in digging the Panama Canal. A large per cent of this comes from the central or cornbelt states, and is deposited in the Gulf of Mexico. Although this figure is enormous it includes only a small part of the soil washed from hillsides, the larger part of which is deposited in river beds, canals, drainage ditches and upon bottom lands. The value of the soil lost cannot even be estimated. It requires centuries to form one inch of soil, to say nothing of the cost of returning the plantfood and humus that is lost. The rolling land in southern Iowa or the hills along the Missouri and Mississippi Rivers, the southern part of Illinois, commonly known as "Egypt," southern Indiana, the rolling sections of Ohio, and Missouri portray vividly the erosion problem.

There are numerous things combined with hilly or rolling topography that cause erosion. The type of soil in some sections has a great deal to do with it. It is non-absorptive, or, in other words, it does not take up water readily. The larger part of a heavy rain will run off on the surface before it has a chance to soak into the ground, and will carry with it quantities of soil particles. Any soil can be made non-absorptive by either farming out the humus or allowing it to be washed away. In the case of some of the heaviest rains a considerable amount of water is found to run off on the surface regardless of the condition of the soil, but where there is plenty of humus or vegetable matter present there will be little washing. Careless handling will cause washing in any type of soil. Where land is plowed, planted or cultivated up and down a slope small ditches are formed, inviting a rain to come and cut them deeper. Such invitations are always accepted at some time during a season. Another instance of careless handling is found where the farmer fails to replace the humus that is lost when a crop is removed from a field. Barnyard manure, and plenty of it, is the best solution to this problem. Plowing under green manure crops will help, but they do not answer entirely.

The most serious cause of erosion, especially in the southern sections of Iowa, Illinois, Indiana and Ohio, and throughout some of the more southern states, is alternate freezing and thawing during the winter months. A few days of warm weather will thaw the top one, two or three inches of soil, and will be followed by a heavy rain, which in many cases will practically strip a hillside of the loose soil. This happens most frequently where fall plowing has been left without a cover crop.

In addition to keeping up the humus content of a soil, practicing proper methods of tillage and using cover crops, there are several other preventive measures. It is true in the case of soil diseases as it is with body diseases that an ounce of prevention is worth a pound of cure. Strip farming has been practiced in a few instances with considerable success. Strips of sod or hay ground are left across the face of a hill between corresponding strips of plowed land commonly from 20 to 100 feet in width. The sod or hay ground tends to check and spread the flow of surface water as it comes down the hillside. Other strictly mechanical means have been found practical: namely, deep plowing, under drainage and terracing. The first two simply cause the soil to take up more water, thus lessening the run-off. Terracing also causes the soil to take up more of the water, but its chief purpose is to remove the water from the field at a velocity so low that there is no chance for washing.

The Mangum terrace is something that is comparatively new. It has been used successfully in different sections of the south as long as 25 years. Only the last three or four years, however, has seen its adoption in the north-central states. It consists of a ridge of earth about 20 feet wide, having the appearance of a well-crowned roadway. These ridges run around the face of a hill, having a small grade varying from one to six inches per 100 feet. Their spacing depends upon the slope of the hill, being calculated by vertical drop. This varies from one to eight feet, depending on type of soil, amount of rainfall and slope of the hillside. There is just enough ditch, usually about 18 inches deep, on the upper side of the terrace to carry the water that falls between it and the next terrace above. The water is made to "walk" off around the hillside rather than run off down the slope. The broad base makes it possible to build a ridge that will not interfere with farm machinery nor be destroyed when cultivated over. No part of the field is lost to cultivation, as is the case with the bench terrace, where only the flat portion is tended.

The equipment necessary to construct a terrace is a surveyor's level, a plow and some form of drag to move the loose dirt. It is probably best practice to hire a surveyor to run the levels. His wage will represent all the actual cash required He can run the levels for the terraces on from 20 to 30 acres per day, thus making the cash required per acre extremely low. It is estimated that after figuring the surveyor's charge and the labor in construction that it will cost $3 to $6 per acre to terrace a field.

Terracing is only the first step toward building up our wornout hillsides, but it makes possible the rest of the program; namely, the use of fertilizers, manure and lime in order to grow better crops, including legumes, so as to feed more stock to make more manure, to add more plantfood and humus to the soil.—C. A. Norman, Tippecanoe Co., Ind.—The Breeders'

The barnyard is about the only place on the farm where crops are never grown; yet often it is the only spot some farmers keep fertile.

—Money in Manure

MORE LEGUMES

Restoration of pre-war conditions
the popular cry. Agricultural rea
justments must inevitably develo
slowly. In the very nature of thing
farming systems require long perio
of time for readjustment. This e
plains why we have harvested a wa
crop two years after the war wa
over. Farming systems and crop r
tations in Illinois are more out of the
proper alignment than they have ev
been within recent years. But eve
in pre-war conditions our farmin
systems were decidedly unbalance
We have now reached the point whe
we dare stop to take an inventory
our farming operations and consu
our compass to see where we a
headed.

A careful survey, just completed
Vermilion county, shows an averag
of only 9 per cent of the cultivate
land in legumes; red clover makin
up 8.1 per cent, and nine-tenths of o
per cent was alfalfa and soybean
In some parts of the county the pe
centage of legumes was as low as tw
per cent. Expressed in another wa
this means a legume once in ever
eleven years, or, in some communitie
once in every fifty years. The inev
table results of such unbalanced cro
ping systems are only too well know
Unless we can immediately take ste
to correct this condition, we will u
doubtedly pay heavily in decrease
yields, more serious outbreaks of cro
diseases, more frequent and mo
disastrous insect ravages, and an i
ferior quality of products grown.

By the liberal use of limestone an
rock phosphate, and with legumes
sufficient amount to properly balanc
the cropping system, the actual ac
yields will be increased, the fertilit
will be maintained, cropping problem
will be more easily solved, labor di
tribution will be more easily take
care of, and general farming system
will be more desirable. While man
farmers are seeking a system tha
should prove immediately profitabl
the provident farmer is now lookin
for a system which will cut dow
costs, build up the soils and provide
better crop rotation—a rotation whic
will make more efficient use of labo
and equipment.

Such a rotation should provide fo
clovers or other legumes to appear i
the rotation at least once in ever
four years, i. e., at least one-fourth o
the crop area should be in some legu
minous crop each year. Only such
system will prepare the farming bus
ness for the profitable times whic
must inevitably come.—The Extensio
Messenger.

TRAMPING SOIL HARMFUL

Allowing cattle to roam over th
fields especially when the ground i
wet or the soil is freezing and thaw
ing during the fall or spring seasons
will be greatly injured by the tramp
ing. It forms holes and clods an
deadens the soil. Cattle should not b
permitted to stray on even the so
fields of grass, on account of the dam
age occasioned by tramping up th
soft soil.

Farming vs. Mining

"True Farming the World's Greatest Industry." Supporting the World's Millions

The Almighty Creator in His supreme wisdom, with a fore-knowledge of our needs, gave us a soil enriched by a natural process through ages annually by the dropping and decaying foliage and grasses, fertilized with their nitrogen gathered from the air. Thus the land was offered for original occupancy of the farmer with a capacity for a maximum production.

It is regretful to report that this splendid sample of farm land, prepared for bountiful yields, has, by a large per cent of the early-day farmers, been shamefully and unfairly treated.

These original occupiers, either as owners or renters, proceeded to take advantage of the soil by taking everything from it, without giving it anything in return. In many cases the same crop was planted or sown successively, year after year, until it so weakened and exhausted the soil that it was unable, in some cases, to produce enough to repay for the labor. The fields were not even rested by rotation of crops.

This manner of usage of the land was mining it, instead of farming. The soil's fertility was extracted by the crop, and then sold at the elevator; thus robbing the farm of its strength and ability to produce. his custom of weakening and impoverishing the farm year by year and reducing its value was a pretense at farming that was an outright failure. It entirely ignored the future and displayed a weakness and a want of knowledge deplorable. The prevalent wish of the early settlers was to get all they could without cost to themselves, which was at the expense of the future generation.

In the last decade there has been an awakening as to our needs, arousing through wise, deep-thinking, farseeing and sound-reasoning individuals, agriculturists, agricultural colleges, experiment stations and farm publications, which are checking this ruinous course of farm spoilation.

This country has reached the limit of the wasteful use of an overworked farm to produce crops without feeding it. We have drawn upon the soil's original resources until it is bound to be reflected in its gradual impoverishment. The relief has come in time through these new progressive forces to recuperate, maintain, rebuild and restore the original productiveness of the soil.

This class of sturdy, honest, determined, wise agriculturists on the farms and in the colleges, by their practical work on scientific lines, will influence and turn the army of farmers on the right road for success. They will save the nation from the fate of Rome. We are told by Vladimir Sinkovitch in a remarkable writing, that the chief factor in the falling of Rome and then of the Roman Empire was traced to the soil impoverishment and exhaustion of their farms.

Every country and nation is vitally interested in the productiveness of its farms. It is the settled, permanent foundation of the health and prosperity of the nation.

The achieving of this victory would give us a new base, from which to continue driving on the lines of progress and forcing yields that will surpass those that grew formerly upon it.

The efforts to determine the best methods and plans to be adopted in the various localities to keep up and improve the qualities of the soil for producing a larger yield of crops is going to be one of the great problems and requirements of the farming humanity for the future.

We feel confident that with the education and enlightenment of the farmer of this day, with the help and assistance rendered by the government in various agricultural institutions and experiment stations, with the agricultural publications' assistance, will be found equal to meet the necessities of the times. We shall profit by Rome's errors and shortcomings.

Whenever a great cause affecting the interest or life of a nation is imperiled, leaders with capacity to meet the necessities of the occasion rise up and save the cause and solve the problem in a practical manner. There are other Burbanks and Edisons among the farmers of today, who by their devotion, keenness and concentration of thought will achieve success and fame on this line and win the applause and gratitude of the nation and become renowned celebrities.

One of the best thoroughly proven methods of building up the fertility of the soil is through the growing of live stock and diversified farming. This is a system that can be introduced at the least expense and carries a profit with it from the start. Instead of marketing the crops they are principally fed to the live stock, which are sold as pork, beef, mutton, milk, butter, wool, etc., etc. There are some crops, such as wheat, that are too costly to feed, but to make up for this, middlings and bran can be bought for feed, and fertilizer for the wheat crop. The extra yield will not only pay for the purchase, but an extra profit besides. In the diversity of the crops, wheat in most sections is a desirable crop, as the ground is left in good shape for seeding alfalfa clover or other grasses. The legumes draw the nitrogen that is needed by the soil from the air, where the supply is inexhaustible and free.

One of the constant demands before every farmer is to make and save all the stable and barnyard manure that he possibly can. This should be put to work in the field that is needing it most. If it is left outside of shelter, the rains and snows will waste it. There are numerous ways of fertilizing the soil that are known, that every farmer can obtain. There is plowing under certain crops and the use of mineral elements needed, such as lime, phosphate, gypsum, etc.

The All-wise Creator has foreseen our needs and the condition we were sure to bring about and has provided great bodies or beds of these minerals in different sections of the country, which we can use to rebuild the productiveness of our soil. Our great Benefactor purposed that we should use our minds and muscles both in this restoring of the yielding qualities to our farm lands.

The Agricultural Colleges are instructing a generation of young farmers who will have the ambition and desire to grasp the problems and solve them with honor and profit to themselves and the country, the value of which will be beyond figures to compute.

There are various associations besides the colleges and press that are making a specialty of educating the farmer on the necessity and profitable increase in the production of crops by fertilizing. Some of these are the Gypsum Industries Association, Association of Natural Soil Fertility Resources, International Harvester Co. These have some of the best scientific minds solely devoted to the study of these questions in all their forms to enlighten the farmers of this country.

Prof. P. G. Holden, a very thorough expert agriculturist of the highest order and director agriculture extension department International Harvester Co., says: "It requires more brains to be a good farmer than to conduct any other business. That the emergency of the war had demonstrated that the farmer is entitled to receive a just and fair compensation for his thought, care, labor and responsibility for his productions.

"No other business man is called upon to solve so great a variety of problems or meet so many varied conditions as the farmer; no other scientist must be expert in so many different lines of scientific work."

It is claimed one-third of the people of the world are engaged in agriculture to feed and clothe the other two-thirds, who wake up every morning hungry. Would it not be a dismal time if the supply should fail? It shows conclusively that the prosperity of the nation rests upon good, wise farming. You ought to be proud to be a good farmer.

A good crop of wheat is said to take from an acre approximately 50 pounds of nitrogen, 9 pounds of phosphorus and 6 pounds of sulphur. Are you taking the proper precautions to return to the soil the proper amounts of available nutrients?

HANDLING MANURE ON THE FARM

There are two important uses of stable manure: to furnish plant food and to improve the physical condition of the soil. To get both results you must take proper care of every bit made on the farm.

A good many years ago Voelcker, in England, showed with proofs beyond doubt that farm manure was used in a very careless and wasteful manner. He showed, for instance, that when manure was thrown into an open barnyard—just as the great majority of our American farmers handle it—and there allowed to lie for a few months, it invariably lost from one-half to two-thirds of its total fertilizing value, besides injuring its physical nature so much that it did little good when applied to the soil. This means that two or three loads of poorly kept stable manure are of no more value when sent to the soil than a single load properly preserved and applied.

Manure properly preserved increases crops.—An example of poorly preserved and well preserved manure is shown in the field tests of the Ohio Station, which have been in progress for years: two kinds of manure were used, yard manure and fresh manure. In both cases the rate of application was eight tons per acre on clover sod, plowed under for corn, and then followed in a three-year rotation of wheat and clover without any further manuring or fertilizing. The table following shows the average increase for each crop for both kinds of manure: Yard Manure 16.03 Bushels of Corn, 8.21 Bushels of Wheat, 698 Pounds of Hay, while Fresh Manure 22.24 Bushels of Corn, 9.73 Bushels of Wheat, 1,280 Pounds of Hay.

This is what Director Thorne in discussing these tests says: "Not only has the manure been greatly reduced in quantity, but the quality likewise has been impaired by exposure—the rain leaching out the most soluble, and, therefore, the most valuable portions. At current prices the average increase from a ton of open-yard manure, including straw and stover, has been worth about two dollars, while that from the fresh manure has reached an average value of nearly three dollars; and this value has been increased to four dollars and fifty cents by reinforcing the manure with acid phosphate."

Methods of applying manure to fields.—Four methods are in use as follows: 1. Piling in small heaps, which are to be spread later in the season. 2. Hauling to fields and piling in large mounds, to be distributed later. 3. Scattering on fields by hand direct from place where made. 4. Distributing by means of manure spreader.

Small piles of manure: a bad practice.—For a long time the most common way of applying manure has been this: Wagons are loaded with manure, hauled to the field; here the manure is dumped into small piles, eight, ten or twelve per load. Later in the season, either in the fall, winter or early spring, these small piles are scattered and the land plowed. Of all methods, this is the most wasteful. It is bad practice; the manure loses its elements, which leach out and sink into the soil; one spot is made rich, the rest of the land receiving an insignificant portion only; on the rich spot the crop—grass, oats or wheat—often lodges and gives no better results than the less favored portions; or the manure heap may heat and ferment, losing a goodly portion of its nitrogen, the element most in demand.

The large mound; now but little practiced.—The piling in large heaps or mounds—thirty to fifty loads to each—is not to be commended unless it can be moistened freely, that fermentation may be prevented. It doubles the handling and materially increases the cost of application. It should be said that this method is a relic of the old days and now seldom is practiced.

The most common form of application is hand scattering with manure hauled direct from the yard to the field.

Hand scattering is objectionable.—The objection to hand scattering lies in the unevenness of distribution. Even with the best care more or less manure falls in bunches, leaving a great number of vacant spaces to get no manure at all. The result is this: On some portions of the soil too much manure goes, and on others too little or none—making a double waste. Here is the opinion of Professor Smith: "Experiments today are wanting to exhibit the losses accruing from throwing the manure at the land in chunks. If manure is hauled out in the dead of winter and scattered from a sleigh box, it is sure to be left in large forkfuls, scattered unevenly. It is impossible to get manure so applied properly worked into the ground to insure the mixing of the decaying organic matter with the soil. Remember that if the decaying manure is not mixed with the earth, where its content of plant food will be absorbed, it cannot exert its beneficial effect on the physical character of the soil. A man of experience is tempted to say that one load of manure spread with perfect evenness is about as valuable as two loads on the same area spread in chunks and heaps. This phase of the question cannot be easily exaggerated. Until the manure becomes an unrecognizable constituent of the soil itself, it has not accomplished its mission. It must be digested in the soil, assimilated into the soil system; and, this is possible alone when it is evenly and uniformly spread." This waste is avoided when the manure spreader is used.

The manure spreader; it pays good interest.—In the first place the manure spreader does its work well. It spreads thinly, uniformly, and evenly—items of much consequence in handling manure. If the growing crop is to receive this farm resource so as to make the best use of it, it should be furnished to the soil in the most wholesome and in the best usable form; it must be given the soil in a way that allows rapid decomposition and complete, even incorporation into the soil.

In the second place, the spreader is a labor-saving device. The four-tine fork method of spreading is expensive and out of date. It costs too much to handle manure in this old way; it does the work too unsatisfactorily; it calls for too much labor it fails in having the manure take to the field properly, thus securing t the soil the full value of the manure both chemically and physically. Th labor in spreading a load of manur by the spreader is less than one-hal that required by either of the ol methods—by spreading broadcast b hand or by piling in small heaps i the field.

In the third place, the manur spreader pays. I know this suggestio means another costly machine for th farm. The question now arises: I the manure spreader worth its cost It most certainly is. In my judgmen there is no machine now used on th farm that pays a better interest o the investment. For simply puttin the manure on the land in the bes form a high rate of interest is paid o the original cost; for decreasing th expense of application a high rate o interest is paid on the investment for having at hand at all times a vehicle for handling manure as it accumulates a high rate of interest i paid on the investment; for doing al these things—for helping the farme with his work, for removing th drudgery and disagreeableness o handling stable manure—the manur spreader is needed and its initial expense is met several times each season.

BURKETT SOILS

COMMERCIAL FERTILIZER VERSUS MANURE

The tests made by the Missour Agricultural Experiment Station, in making a thirty-year average trial fo a practical demonstration of the value of commercial fertilizers which are in common use in that state, compared with manure, should be useful.

The wheat plot on a six-year rotation with enough fertilizer to reeplace all the nitrogen, phosphorus and potassium in forty bushels of wheat and two tons of straw, produced thirty bushels of wheat per acre.

The plot where one-half the fertilizer above was applied, together with three tons of manure, the yield was 30½ bushels of wheat per acre. It it stated the fertilizers and manure applied in these tests were too heavy and expensive for practical use in general farming in Missouri.

The plot on which manure only was used the yield was 26½ bushels wheat per acre.

The plot which received no treatment produced 20 bushels per acre. The foregoing plots were all on a six-year rotation.

The plot continuously sown to wheat with fertilizer used made 18.7 bushels, and the one with manure 18.1 bushels. The plot without any treatment 9½ bushels.

It is thus seen that fertilizers have kept up the yields as well as manure, when averaged for thirty years.

It was further shown that corn and hay were better with manure, but wheat and oats better with fertilizer.

Permanent fertility on the farm is largely dependent on keeping stock on the farm and the conservation of manure from that stock.

WHAT CROPS ARE MADE OF

It should be kept in mind that crops re not made out of nothing. They are composed of ten different elements of plant food, every one of which is absolutely essential for the growth and formation of every agricultural plant. Of these ten elements of plant ood, only two (carbon and oxygen), are secured from the air by all agricultural plants, only one (hydrogen), from water, and seven from the soil.

Nitrogen, one of these seven elements secured from the soil by all plants, may also be secured from the air by one class of plants (legumes), n case the amount liberated from the soil is insufficient; but even these plants (which include only the clovers, lfalfa, peas, beans and vetches, among our common agricultural plants), secure from the soil alone, six elements (phosphorus, potassium, magnesium, calcium, iron, and sulphur), and also utilize the soil nitrogen so far as it becomes soluble and available during heir period of growth.

Plants are made of plant-food elements in just the same sense that a building is made of wood and iron, brick, stone, and mortar. Without materials, nothing material can be made. The normal temperature, sunshine, rainfall and length of season in Central Illinois are sufficient to produce 50 bushels of wheat per acre, 00 bushels of corn, 100 bushels of oats, and four tons of clover hay; and when the land is properly drained, properly tilled, such crops would requently be secured if the plant oods were present in sufficient amounts, and liberated at a sufficiently rapid rate to meet the absolute needs of the crops.—Ills. Agr. Expt. Station Report.

LIBERATING PLANT FOOD

Limestone and decaying organic matter are the principal materials which the farmer can utilize most profitably to bring about the liberation of plant food. The limestone corrects the acidity of the soil and thus encourages the development, not only of the nitrogen-gathering bacteria which live in the nodules on the roots of clover, cowpeas, and other egumes, but also the nitrifying bacteria, which have power to transform the insoluble and unavailable organic nitrogen into soluble and available nitrate nitrogen. At the same time, the products of this decomposition have power to dissolve the minerals contained in the soil, such as potassium and magnesium, and also to dissolve the insoluble phosphate and limestone which may be applied in low-priced forms. Thus, n the conversion of sufficient organic nitrogen into nitrate nitrogen for a 100-bushel crop of corn, the nitrous acid formed is alone sufficient to convert seven times as much insoluble tricalcium phosphate into soluble monocalcium phosphate as would be required to supply the phosphorus for the same crop.

Tillage, or cultivation, also hastens he liberation of plant food by permitting the air to enter the soil and burn out the organic matter; but it should never be forgotten that tillage is wholly destructive, that it adds nothing whatever to the soil, but always leaves it poorer. Tillage should be practiced so far as is necessary to prepare a suitable seed bed for the root development and also for the purpose of killing weeds, but more than this is unnecessary and unprofitable in seasons of normal rainfall; and it is much better actually to enrich the soil by proper applications or additions, including limestone and organic matter (both of which have power to improve the physical condition as well as to liberate plant food), than merely to hasten soil depletion by means of excessive cultivation.—Ills. Agr. Expt. Station Report.

WHEN TO USE LIME OR LIMESTONE

Certain action of bacteria on humus in the soil liberates organic acids which will produce a sour condition in the soil if allowed to remain. This acid condition prevents growth and seriously hinders proper development of the plant itself as well as retarding development of the nitrogen producing bacteria in the roots of legumes.

The simplest and most effective cure for this sour condition is the application of ground limestone or screenings which in effect neutralizes the acidity as well as furnishes calcium for plant food and physically "loosens up" the soil by its granular condition.

The spreading of limestone, probably, ranks second only to the timely spreading of manure in the progressive farmer's program for better crops and increased profits.

Any person can make a simple test for acidity by procuring at the drug store a piece of "blue" litmus paper and after burying it over night in moist soil, if the paper has turned red or shows a tendency to turn red the soil is "Acid" and will be benefited by limestone.

Litmus paper is simply strips of filter paper soaked in the colored juice of certain lichens and dried and is normally a neutral tint between red and blue but turns pink or red under the action of acid and blue under the action of alkali and reverts to its original shade when the acid or alkaline condition is neutralized.

This is probably the commonest test of acid we have. Try it down there in the hollow where the clover don't "ketch."

KEEP THE SOIL PRODUCTIVE

How to Plan a Rotation for Maintaining Fertility

The first essential in the maintenance of fertility is a cropping system which includes legumes. For Missouri, the best legumes to grow are the clovers—red, mammoth, alsike and, in some cases, sweet clover or alfalfa. According to M. F. Miller of the Missouri College of Agriculture, red clover is best adapted for use in most rotations.

In planning a soil building rotation the number of grain crops must be limited. One year of corn in three is the maximum; one year in four is even better for average lands. Between the corn crop and the clover crop there should be one or two small grain crops, such as oats or wheat. These small grains may be used as a nurse crop for clover, while the grain may also be sold as a cash crop. One difficulty farmers have in maintaining a proper rotation is the failure of certain crops like clover or wheat during unfavorable seasons.

Clover will grow on most most soils, with proper treatment, except on the very worst seasons, but lime and sometimes phosphates are necessary to make it grow. The small grains also need phosphates on most Missouri soils.

In case a failure occurs, however, it is not wise to put in corn, but rather use a crop similar to the one which fails. For instance, if clover fails use some other legume like cowpeas or soybeans, which has the same effect on the land. If wheat fails, it is usually wise to put in oats and use this as the nurse crop for clover.

It is important that the cropping system be well worked out and that the crops follow each other in regular order if the greatest success is to be attained.—Mo. Agr. Col.

SAVED SOIL AND WON FAME

An inquiry received by the Missouri College of Agriculture as to the origin of the word Mangum as applied to the soil-saving terrace. It is interesting to note that this form of terrace is an American invention, originated by a North Carolina farmer named P. H. Mangum, only 41 years ago. These simple devices saved the Mangum farm and made its owner famous. The original terraces built by Mr. Mangum on his farm near Wake Forest are still effective in preventing the disastrous erosion of the red clay soil of that hilly section. Speaking of these terraces, W. C. Etheridge, head of the field crops department at Columbia, who is a native of North Carolina, and personally familiar with the old Mangum farm, says that all good farms in the Piedmont section of North Carolina now use Mangum terraces, for without this means of soil saving a farm in that region cannot long remain in the class of good farms.

SOIL BUILT UP BY SWEET CLOVER

The Northwest Experiment Station at Crookston strongly recommends the growing of sweet clover on a more extensive scale than heretofore. A recent statement issued at the branch station says:

"Sweet clover is not only one of the greatest soil enrichers, but is valuable feed for livestock. It adds humus to the soil because of the depth to which the roots penetrate and the ease with which they decay. Land that has been cropped with sweet clover which has been inoculated will grow a better stand of alfalfa without further inoculation.

"Sweet clover is commonly sown with a nurse crop. It is more easily plowed up than alfalfa. It is a cash crop when grown for seed and should be tried at least on a small scale by farmers.

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American Farm Bureau Federation News

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

NATION'S STRONGHOLD

The farmers of America are the tronghold of the nation. To their turdy efforts and labor, depends the production of the food for the susenance of themselves and the balance of the population of America and to eed the hungry elsewhere. They are he keys to unlock, to reach that which preserves the lives of the people. The natural selfishness and avariciousness of an uncertain number of the people, ender it necessary for the farmers to organize to protect their interests and ights, saving themselves from unjust discrimination and treatment.

The American Farm Bureau Federation, is as broad as the nation, and is he strongest and best organization hey have ever had. The founders have exercised much wisdom in their endeavors to serve the interests of he farmers as a body. It is not to be supposed that it will be perfect o start with in every particular in its operation. But if in the practical working, there is need of changes, hey will be made by a body that is air minded.

A wide research is being made on various points relating to farmer's inerests. Co-operation methods in buyng supplies, and selling productions, s receiving special attention. United s strength, divided is weakness.

President O. E. Bradfute of the American Farm Bureau Federation declares that the Farm Bureau and co-operative marketing must go hand n hand. This is merely an expression of a fixed policy of organized farmers. It found formal declaration at the ourth annual convention of the American Farm Bureau Federation, when it was ordered "to unify or co-ordinate all organizations, agencies, and interests in behalf of a comprehensive and united program of co-operative marketing in the United States."

The present administration of the American Farm Bureau Federation has had no more important problem to solve than the one of working out a definite relationship between the Farm Bureau and the co-operative marketing movement. In every state in the Union this problem has been of chief concern to the men in positions of agricultural leadership. Every State Farm Bureau is asking for a definite method of carrying out the get-together policy.

For weeks and months the headquarters staff of the American Farm Bureau Federation has been studying the problem of relationships between the co-operative marketing associations and the Farm Bureau. The Executive Committee at its last meeting emphatically favored the extension of Farm Bureau service to include the co-operative marketing associations. There have been many conferences between the president and his department chiefs on this point. Several weeks ago President Bradfute appointed committees to work out a definite plan for co-ordinating the service work of the Farm Bureau and the co-operatives. These committees submitted their reports to the entire headquarters staff. The result is the adoption of two suggestive contracts—one between the County Farm Bureau and the co-operative, and the other between the State Farm Bureau and the district or state-wide marketing association.

The contracts speak for themselves. They are bases of understanding which definitize the policy of service as between the Farm Bureau and the co-operative marketing association.

The Farm Bureau and co-operative marketing are mutually interdependent. The contractual relationships now suggested will carry them forward hand in hand to even greater service for American agriculture.

"CO-OPERATIVE MARKETING"

A Review

Co-operative marketing is the biggest question in American agriculture today. It is the subject of discussions in the messages of presidents and governors; it is the topic of conversation in the cross-roads grocery. More than 800,000 American farmers have signed contracts to market their crops co-operatively, and last year more than $1,000,000,000 worth of farm products went to market through co-operative channels—a five-fold increase in ten years. At the present rate of progress this figure will be doubled in two more years.

All these facts—and many more—are told in a book on co-operative marketing just off the presses, written by Herman Steen and issued under the auspices of the American Farm Bureau Federation. It tells the story of the American co-operative movement—how and why it started, how and why it grew, its failures and its successes. The author wastes no time in propaganda or theoretical discussion or abusing the middleman—he tells the story of 100 of the leading co-operative associations in the United States and Canada, carefully chosen for importance to the movement. Every important farm commodity is represented in this volume, and so is nearly every state and province in the United States and Canada. Furthermore, these stories of actual operation of co-operative marketing associations are written by an experienced writer, and they are as easy to read as the latest novel.

This new book, "Co-operative Marketing: the Golden Rule in Agriculture," fills a long-felt want for definite, dependable, carefully compiled information on co-operative marketing. It is valuable because it summarizes practically all the American experience on the subject and presents it in a form easy to grasp and understand; it is valuable because it analyzes failures as well as conspicuous successes; and it is valuable because it presents the philosophy of successful co-operative marketing as the author sees it after visiting nearly every important co-operative association in North America. It ought to be in the hands of every farmer, rural banker and farm leader who now belongs to a co-operative association or who is interested in the movement.

The publishers of "Co-operative Marketing" practice what they preach. They are charging but $1 for their 366-page book, well printed and well bound. Copies may be secured by addressing the American Farm Bureau Federation, 58 East Washington St., Chicago, Ill., or through this office.

PAYS $7,000 DIVIDEND

The Michigan Live Stock Exchange has paid a patronage dividend of $7,000 to the member associations which have shipped live stock to the co-operative commission house at Detroit. This represents a saving of approximately 40 per cent on the first year's business. During its first year the Michigan Live Stock Exchange commission merchants at Detroit handled 4,129 carloads of stock or 30.5 per cent of the total business at the Detroit stockyards. The Michigan Live Stock Exchange has a membership of 119 local co-operative shipping associations. The Exchange is affiliated with the Michigan State Farm Bureau. John M. Beadle is manager.

STUDYING RESOURCES

President O. E. Bradfute, of the American Farm Bureau Federation, has accepted appointment to serve on the Departmental Committee for the Natural Resources Production Department of the Chamber of Commerce of the United States for the coming year.

CROP REQUIREMENTS

One bushel of oats (grain or straw) requires one pound of nitrogen.

One bushel of corn (grain and stalks) requires one and one-half pounds of nitrogen.

One bushel of wheat (grain and straw) requires two pounds of nitrogen.

One ton of timothy hat requires 24 pounds of nitrogen.

One ton of clover contains 40 pounds of nitrogen.

One ton of cow peas contains 43 pounds of nitrogen.

One ton of average manure contains 10 pounds of nitrogen.

For easy figuring it is worth keeping this foregoing table in mind.

The roots of clover contain about half as much nitrogen as the tops, and cow peas contain about one-tenth as much as the tops.

—Agr. Exp. Station, Uni. Ill.

BULLETINS RECEIVED

Director H. W. Mumford of University of Illinois Agricultural Experiment Station, Urbana, Illinois, has mailed us No. 242, "Flag Smut of Wheat, with reference to Varietal Resistance"; No. 243, "Corn Varieties for Chinch Bug Infected Areas," for April, 1923; No. 258, "Orchard Practice for the Control of Blister Canker of Applie Trees"; No. 270, "Chinch Bug Barriers," for May 1923.

MISSOURI'S 1922 YEAR BOOK

Secretary Jewell Mayes of the State Board of Agriculture has produced a full ripe year book for 1922 enriched with the great crop of good things happening in the State of interest to the farmer. There are addresses, lectures by ladies and gentlemen of prominence, their instructive happy sayings, wise thoughts, sweetened with humor and pungent with anecdote and poetic strains that enlivened their audience with merriment, rendering the occasions enjoyable schooling.

There are statistics voluminous upon all the principal crops, live stock and many other things by counties. The figures make you dizzy in even looking at them, when you think of the work that was required to prepare them.

The address of honor at Missouri's 1922 Farmers' Week, by Governor Arthur M. Hyde, who is deeply interested in all matters concerning farming and farmers, covers nine pages.

These are only a few of the things that are contained in this 476 page book of valuable matter stored in it. It reflects great credit to the superior efficiency of the State's most worthy Secretary of the Board of Agriculture.

CHINCH BUG INOC. NO GOOD

The inoculated chinch bug plan has been utterly abandoned in Missouri for years by the State Experiment Station, College of Agriculture and Board of Agriculture. Farmers are advised to not write for diseased or infected chinch bugs, because no provision is made by any authority for furnishing them.

Any farmer wishing to experiment can develop the infection with reasonable care in using a common fruit jar partly filled with very moist soil, placing therein a quantity of bugs kept covered with moist leaves in a dark place, under rather high temperature.

Weather conditions in Missouri in many sections during May and early June have been unfavorable to chinch bugs, while discouraging for farm crops. The State Board of Agriculture recommends that the chinch bug barriers and other control measures approved by the State Experiment Station be earnestly practiced by farmers menaced by chinch bugs at this time or later in the season.

Secretary J. C. Mohler, of Kansas State Board of Agriculture, says: "Chinch bug eradication by means of inoculated bugs has proved an absolute failure."—Mo. Clip Sheet.

FERTILIZING THE CORN CROP

Acid Phosphate With Manure Most Likely to Give Profit

Many inquiries are reaching the Missouri Experiment Station, having to do with the fertilization of corn. The Experiment Station has carried on many experiments in corn fertilization, and while some of the results have shown considerable profit, others have not, says M. F. Miller, head of the soils department.

The situation regarding fertilizing corn in Missouri may be briefly stated as follows: On average to thin land, in seasons of good rainfall, the use of bonemeal, acid phosphate or a highly phosphatic mixed fertilizer, applied with a fertilizer grain drill at the rate of 150 to 200 pounds per acre before the corn is planted, may be expected to give very good returns. The same is true of an application of these fertilizers at the rate of 50 to 75 pounds per acre in the hill or drill. In dry seasons, however, the drought usually offsets, to a large extent, the effect of the fertilizer so that little or no return may be expected. But even in these seasons it often happens that the phosphate in the fertilizer hastens the maturity of the corn somewhat and improves its quality sufficiently to make the use of the fertilizer worth while.

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Speaking from average returns, it is difficult to become very enthusiastic over the use of fertilizer with corn. Those farmers who have enough manure accumulating around the barns and lots to cover most of their corn land with a thin dressing will find it advantageous, in most cases, to apply 20 or 30 pounds of acid phosphate on each load of manure just before it is taken to the field. The spreader will mix the phosphate with the manure sufficiently and this seems to be one of the best ways to use phosphate with corn. Unfortunately most men have not enough manure for this purpose, so that this plan is limited to a few farmers. It seems, on the whole, that one is somewhat more apt to secure satisfactory returns from fertilizers on soils that are too thin, since on thin soils the drought is more injurious than it is on soils that contain a fair amount of organic matter.

The use of fertilizer in the hill o drill is not a practice to be generall recommended without the prope crop rotation and the use of suc manure as is available, since there i not enough fertilizer applied to hel the land and there is a tendency, under these conditions, for a farmer t grow corn on the same land too long In such a case this use of fertilize may actually be a detriment to th soil in the end, although it is not th fertilizer that causes injury, but th fact that by using a little fertilizer i this way the farmer is apt to run hi land too long to corn, thus depletin the supply of organic matter in th soil. Where hill or drill fertilizatio is combined with proper rotation an manuring, it is one of the most economical ways of using fertilizer wit the corn crop.—(Colo.) News.

CROP ROTATION

The county agent, Parke County Indiana, states that the rotation o crops in cultivation that has bee quite satisfactory from their experience is corn with soybeans, whea and clover.

He further states that in referenc to using fertilizer, they make trial of different formulas on small plot of ground and adopting the one showing the best results, has been th method mostly followed.

THE HOOSIER'S CALL

To produce the farmer more means
Give him lots of lime and soybeans
It feeds his stock and saves him toi
And same time it improves his soi

SUCCESSFUL CORN SHOW

County Agent Devises New Plan o Financing Show

Saline County's eighth annual cor show at Marshall was very successful. There were 41 entries in th three-bushel class, making 123 bushel of corn turned over to the management of the show as entry fees. According to a plan worked out thi year by Asbury Roberts, county extension agent, the show was mad self supporting by the sale of thes three-bushel entries. One-third th sum received for each lot was returne to the exhibitor, one-third went int the premium fund, and one-third wen to pay the running expenses of th show. Premiums were offered in percentages of the gross premium fun in each class.

Of the 41 three-bushel entries, a but three were of Reid's Yellow Dent There were two entries of Johnso County White and one of Boon County White.

The first prize bushel was exhibite by Roy Clough of Marshall and sol at auction on the last day of the sho for $125. The most spectacular winning was made by a boy, Robert Gadberry of Miami, who won first o single ear, first on 10-ear sample, firs on 20-ear sample, second in boys special three-bushel class, and sevent in the men's three-bushel class. Hi exhibits were of Johnson Count White.

The entire lot of 123 bushels of cor sold for an average of $4.50 per bushel.—Mo. Clip Sheet.

MISSOURI'S SOIL MAP

By Dr. W. A. Albrecht

Because Missouri believes that the ruth of the famous quotation "Our National Wealth Lies in Our Soil," cannot be realized to its fuller scope without emphasis, she has had erected in her Resources Museum, at he new state capitol building, in Jefferson City, a large map of the state, made of the soils as they occur n their respective localities. A case of native Missouri black walnut about 2 feet square, with plate glass sides and top surrounded by bronze rail, gives excellent setting for this telling exhibit. The map is of maximum size possible in the case. It shows the county boundaries with small county names, the stream courses, the eight principal cities and 30 main kinds of soil in the state, each of which is numbered according to a descriptive egend in the border. Thus, in truth, t is a "soil map" in the fullest sense of the words, made of Missouri's different soils and telling where they occur and what they are good for.

Diversity in soil resource is evident n the exhibit. It represents the glaciated soils of north Missouri, the imestone uplands of the Ozarks, the Great Plains of the West, and the alluvial soils bordering her great rivers and filling her flood plains of Southeast Missouri. It is a great galaxy of color, ranging from the dark blacks through to the grays and almost whites, and from the reds hrough to the browns or yellows, and exhibits a variety of soil textures ranging from the sands to the clays, with a great predominance of the silt oams so fundamental to the corn belt agriculture.

Such a map is the result of information collected from the careful soil urvey work by counties, of which over half have now been carefully mapped. Missouri has been taking nventory of her soil resources, and he Museum Commission submits the map as a partial report of this invenory by the Soils Department of the College of Agriculture at the University of Missouri. The Museum Commission has expressed its appreciation of the significance of our soil as a great resource by giving this "soil map" exhibit the choice location in he Museum, with the hope that the passing public will appreciate the magnitude of this resource and will more fully realize the need for its careful conservation.

The editor will add, which the modesty of the constructor omitted: This soil map is considered by all who have seen it truly wonderful. There is certainly good ground for he pride of the state shown for it, and reflects high credit to the Department of Soils of the State Experiment Station and College of Agriculure, under the charge of W. A. Albrecht, Asso. Prof. of Soils, Columbia, Mo. The case enclosing the map ost $1,200.00. The labor of building he ground work of the map would pay for a high class model farm and will prove a satisfactory investment.

Supplement your barnyard fertilizers with necessary mineral nutrients y added commercial fertilizers.

THE SICK FIELD

As you can't send your field to the hospital, you will have to use a nurse. This field is so weakened on account of the lack of humus (muscle) in the soil that it is necessary to provide this to enable it to help itself. This should be the first step to take towards recovery as prescribed by Dr. Burkett. This can be done by using green manure. You have to select a crop that will grow on poor soil. The cow pea has been found to meet the demands for this purpose. Use a bushel of seed per acre, sowing them broadcast.

When the crop is ripe, plow them under, going about an inch to two inches deeper than plowed before. The next season, either disk the land or replow it and sow the second crop of cow peas, using the same amount of seed per acre, sowing broadcast.

This second crop will show a good growth and you will be inclined to harvest for hay. But it will pay well to let it mature and plow under for the good of the soil, where it is needed for the nitrogen it holds and the humus in its rich tissues. You can help the soil with fertilizer to supply deficient elements and rotate crops.

Use legumes in every kind of rotation, a legume every year if possible, and cow peas in every crop of corn, using the last cultivation of the crop, as seeding time for the cow peas. A party harvested 36 bushels of corn and 12 bushels of cow peas on a field that had been abandoned a few years before by this treatment.

VALUABLE PRACTICAL SCHOOLING

The actual tests at the Agricultural Experiment Station of formulas studied out in relation to plant, seed, or fertilizing, and then practically executed, result in a crop of experience that an ordinary farmer could not afford to undertake to produce independent of proof of result.

There are some uncertainties in farming that have to be risked, that of drouth, rain, or storm; adding to these the unknown results prior to making the test, would prevent most farmers from the trials.

This causes a valuable service rendered by the Agricultural Experiment Stations in furnishing this ripe experience, showing what can be done, and what cannot. The farmers who are close observers of the experience of others secure a knowledge of great worth to them practically free, that cost much time and money to those originally producing them. "BAYNES' SOIL IMPROVER" proposes to give their readers these monthly crop of experiences.

THE EARLY USE OF GYPSUM

The editor of the "BAYNES' SOIL IMPROVER," in the years 1852-3-4, dropped a small handful of Plaster Paris in each hill, just in front of the man covering the corn in the hill, who separated the compost that had been dropped in the hills. There were two men using shovels in placing the compost from the cart that was tilted up on a drag, attached by chain to the axle of the cart, made it convenient. Each man usually took four rows in composting the hills.

There was lots of work to it but we raised big crops of corn, and we kept up the use of gypsum year after year. This farm was 18 miles from Philadelphia at Gwynedd Post Office.

PROTECT THE SOIL

The farmer depends directly on the soil's power to produce not only for his own family's support, but for his business in furnishing an overplus for sustaining lives of others.

The whole population therefore are dependent upon the soil. The consequent importance of protecting the soil is of the gravest character to the farmer and to the nation at large.

There are by far too many farmers who have not given the thought to this subject that its importance demands. They have worked the soil without feeding it, thus weakening and decreasing the crop year by year. The farmer should keep his eyes and ears open, to see and hear what is happening around him and adopt methods that are proving successful. Use "BAYNES' SOIL IMPROVER," it will furnish you with tried out valuable truths by the Agricultural Experiment Stations, that will aid you in enlarging your crops by increasing the fertility of the soil of your farm. Every farmer should send in a club of eight subscribers for one year for one dollar, thus benefiting seven neighbors and helping the county.

ROTATION FIRST STEP TO ESTABLISH FERTILITY

The Missouri College of Agriculture Experiment Station, has formulated a system of rotating crops best suited for adoption in their state.

Not all the crops that may be grown in each locality have been treated here, nor have all the possible good combinations been arranged, but sufficient principles and examples have been given to enable anyone interested in special combinations of crops to devise a plan suited to his special conditions and needs.

There is great need for improved systems of cropping over most of the state; especially is there a need for a more general use of legume crops particularly red clover.

Begin with plowing a sod for corn to be followed with oats, or soy beans and followed by winter wheat and clover.

Rotation alone will not maintain soils but is probably the greatest factor in most practical systems of soil management, and when supplemented with proper use of manures, lime, and phosphates, complete, profitable, and permanent systems of soil maintenance may be evolved, to the great benefit of the individual and following generations.

Johnny: "Say, paw, I can't get these 'rithmetic examples. Teacher said somethin' 'bout findin' the great common divisor."

Paw (in disgust): "Great Scott! Haven't they found that thing yet? Why, they were huntin' for it when I was a boy."

WEEDING MEADOWS

Having for a good many years successfully practiced on his own Ray County farm what he has been advocating, Wm. D McKee, farmers' institute lecturer of the Missouri State Board of Agriculture, today issued a practical warning against meadow weeds, pleading for definite methods of control and eradication. McKee's declaration of 1923 weed war follows:

"The time to begin to weed a meadow is at the time of purchasing or threshing the grass seed.

"I rely almost exclusively upon a tilling-spade, kept both sharp and bright, in fighting the first battles of my meadow weed wars.

"I keep this reliable and almost indispensable agency at all times where I can lay my hands on it with the greatest possible convenience.

"The weeds that give us the most trouble in our meadows in northwest Missouri are mullein, thistle and sourdock. I wait until these plants begin to head—then they can be seen many yards away.

"Press the spade down along the side of the plant and pull it out, root and branch—not breaking it off to be left to respout and produce several plants instead of one single plant.

"Shake the dirt off the roots of the bespaded plant, and cut the stem off down close to the crown; if you don't do this, some of the seeds may and would almost surely mature.

"By beginning early in your meadow weed war you will be saved the trouble and hateful task of hauling these plants out of the field. If left until ripe, you will be scattering the vicious seeds everywhere.

"Burn the vicious weed plants if the seed has been allowed to ripen and don't throw them into a brush-thicket, into a creek or drain to be washed down to pollute the farms or neighbors down the line.

"When iron-weeds, rag-weeds, fleabane and other weeds gain foothold to such an extent as to reduce the quantity and quality of hay, it would be in keeping with good farm practice to plow up such a meadow and plant it to corn or some cultivated crop.

"Think of the unlimited damage these weeds do. They consume plant food and soil moisture that often (yea, always) could be used to a gloriously good advantage by the grass plants themselves.

"Meadow weeds lower the grades of hay, and, remember, farmer friends, that hay quite generally sells on grade.

"Talk with the graders of and honorable dealers in tame hay, and they will tell you that the farmers of this country lose millions of dollars by allowing these weeds to grow and be baled into their hay at a loss of many times more than it would cost to free meadows from these eyesores. Think of it—moving, raking, pitching, baling, hauling, loading and handling—paying freight and lowering your grade (both financially and comparatively) as a farmer by placing on the market low grade hay. Let us unite to reduce our weed tax."—Secretary Jewell Mayes Clip Sheet.

DOES HILL FERTILIZATION OF CORN RESTRICT ROOT GROWTH?

A further substantiation of the reports from other experiment stations that fertilizing corn in the hill does not restrict root growth is given by C. E. Miller, of the Michigan Station, in its quarterly bulletin for November, 1922.

The soil on which this experiment was conducted was a dark sandy loam. A 3-10-4 fertilizer was used at the rate of 200 pounds to the acre in the hill, as against 400 pounds broadcast.

Professor Millar states: "The corn fertilized in the hill made a much more vigorous growth than that on the broadcasted treatment." Two examinations of the root systems were made at different periods. "No limitation in development or localization of feeding roots was evident. . . . Hill fertilization advanced the maturity of plants.

"The observations of some farmers that corn fertilized in the hill suffers more from drought is not due to a more limited root system. When such a condition prevails, the reason lies in a greater moisture requirement of the plants, due to greater vegetative growth."

STOP THE CORN BORER

The Farm Bureau program of work includes stopping the corn borer, the aggressive insect menace to the cornbelt. When first discovered the European corn borer occupied an area of about 100 square miles in the vicinity of Boston, Mass. In the past five years it has spread over a total area of nearly 7,700 square miles. It is found in eastern Massachusetts, southeastern New Hampshire, and eastern New York, and in a narrow belt along Lake Erie in New York, Pennsylvania, Ohio and Michigan. There is an extensive infested area in Ontario, and it may be that fields on the American side of the lake were first infested by insects originating in Canadian fields. The insect is thought to have been brought into New England in 1909 or 1910 in broom corn imported from Hungary and Italy. For full information about the pest write the Department of Agriculture, Washington, D. C., for Farmers Fulletin 1294, "The European Corn Borer and Its Control." Every corn grower should learn about it, and do his bit to stop the invasion.

WHAT WASHES OUT OF SOIL?

When water percolates through earth, what does it carry out of the earth with it? That question no doubt was asked many thousands of years ago and has been repeated from time to time ever since, but it has never been completely answered. The answer, however, is being written bit by bit. The chemical and mineralogical nature of the materials extracted from soils by treatment with water has been under investigation by the Bureau of Soils, U. S. Department of Agriculture, for some time past. A number of minerals have been identified in these products and it has been shown that the evaporated water extract of solids leaves a residue showing considerable
resemblance to the Stassfurt and othe
natural saline deposits. A materia
provisionally called ultra clay, whic
consists of particles so fine they re
main in practically permanent suspen
sion, has also been obtained by thes
extractions, and its properties are no
under investigation. This ultra cla
contains a much larger proportion o
soluble salts than the soil from whic
it has been separated. A very signif
cant attribute of ultra clay is its hig
absorptive power for potash. Soil
containing a large proportion of ultr
clay erode easily.—U. S. Departmer
of Agriculture.

BIGGER CROPS TO LOWER TH BUSHEL COST OF PRODUC TION.

Referring to the subject of lowerin
the cost of producing a bushel or to
of farm produce. we quote the follow
ing excerpt from resolutions adopte
at a meeting of the Indiana Cor
Growers' Association:

"Be It Resolved—First. Recogni
ing the great problems now confron
ing the world in connection with th
supply of food and the cost of sam
we recommend that each individu
farmer and group of farmers make
careful study of the needs for greate
production to the end that the unit
production may be materially i
creased, this to apply to the produ
tion of meat animals as well as gra
crops. This increased production
always at a less cost per unit and wi
serve the purpose of a greater suppl
of foodstuffs, enable the farmer
make a greater profit, and at the sam
time dispose of his products to th
ultimate consumer at a less cost."
Soil Imp. Com.

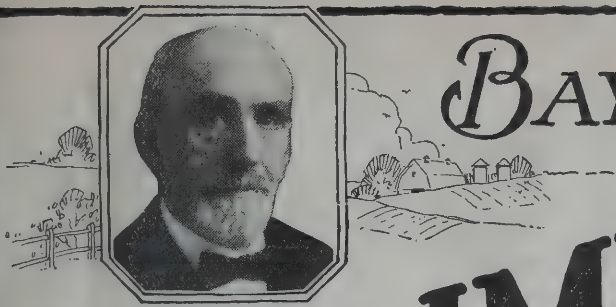
HUMUS A SOIL NECESSITY

The diversified or mixed farming
one of the plans of maintaining or im
proving the fertility of the soil. Th
manure from live stock and the fee
ing back to the soil, the crops grow
from it, is beneficial to the soil. It
a good rule to adopt to secure all th
home-made manure possible. Do n
let it waste by letting it lie in the u
covered barnyard leaching from th
rains, fermenting and evaporating b
the sun, decreasing its value ofte
one-third or more. The progressi
plan is to spread it on the field d
sired to be fertilized as soon aft
made as possible. The stable manu
covering that from all classes of li
stock is virtually a gift to you, a
special effort should be made to sa
and utilize it.

Grow clover, alfalfa and oth
legumes, and crops of them can
times be plowed under and furnish o
ganic matter as a soil builder. T
foregoing plans help supply humus.

The farmer can aid in improvi
and maintaining the fertility of h
soil by diversifying the crops raise
The various crops should be rotate
it prevents running down of the s
and serves as a rest.

The farmer who once undertak
to study the working of nature's la
will become thoroughly intereste
especially when he beholds the ben
fits to the growing crops. Legume
alfalfa and clover with their de
roots subsoil the field, increase hum
and add nitrogen to the soil.



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW
WHERE ONE NOW GROWS"

EDITED BY JAS. BAYNES, 38 YEARS EDITOR OF THE AMERICAN SWINEHERD

Vol. 1 AUGUST 1, 1923 No. 2

MEN have always been brave for their country. Love of country, is love of soil.

The greatest men of our country, were true lovers of the soil, such as Washington, Lincoln and a host of others. These men by their devotion to their country have become renowned. The millions of humble men who did not aspire to greatness, their country, their homes, and their soil, were just as dear to them as the greatest.

Legions of them sacrificed their lives in their country's defense and the greatest could not do more than this.

The soil is the treasure of the country, beyond a money equivalent. It is life giving to all the people and to every industry. To be deprived of the Soil, would mean destruction and death.

Since the soil is so dear to us, and so essential, and its power for good is so mighty, we should give it the best of care to strengthen its force, and increase its energy, for the greatest good.

Ye farmers are the caretakers of the soil, you can ask yourselves the question, whether you are doing your full duty in looking after the welfare of your supporting soil.

Published monthly by JAS. BAYNES & CO., *Webster Bldg., Chicago, Ill.*

SUBSCRIPTION 25 CENTS A YEAR

THE WHEAT CONFERENCE

The prominent officials of the great wheat states coming together in Chicago, Ill., was a most important body of persons having the true interests of the farmers at heart. The price of wheat was selling too low to pay the farmer the cost of production. Wheat is our principal crop for international consumption. The crop raisers have outraced the breat eaters. Gov. Preus of Minnesota, Gov. Hyde of Missouri, and Gov. Nestos of North Dakota, Senator Capper of Kansas, and Senator Copeland of New York and President Bradfute of National Farm Bureau Federation and Dr. Alonzo Taylor, head of the Food Research Institute of the Leland Stanford University.

Dr. Taylor was chief food expert of the United States food administration during the war. He is thoroughly posted on the question and is acknowledwed as the leading authority in economic problems connected with the growing and distributing of foodstuffs.

Dr. Taylor presented facts and figures regarding the American farmers present international condition. Europe's imports of wheat just preceding the war were approximately 550,000,000 bushels a year. Its imports for this season is likely to be 600,000,000 and still leaves us with an unsold surplus.

Dr. Taylor stated the difficulty is not in Europe. The trouble is, the five years just prior to the war, our average wheat acreage in this country was 49,000,000, while in the last four years the acreage has been 65,000,000. Our surplus of wheat grown from the increased acreage is beyond Europe's needs.

It was decided, the way for the American for relief for his grain surplus was to sell only the highest grade that will command the top prices. Also to promote a demand for wheat products. The price of a loaf of bread sells to the consumer for about the same as when wheat was a half a dollar higher per bushel. A national wheat council composed of all branches of the wheat industry was formed for the consideration of the problems of the industry.

BIG GAIN IN ALFALFA ACREAGE SEEN IN 1923

"Do your alfalfa seed shopping early" is the advice of farm crops men at University Farm who have prepared a list of growers who have limited quantities of superior Grimm seed for sale. Prices are likely to be some higher later on, hence the desirability of laying in a stock when quotations are reasonable and the supply is fairly good. A noticeable impetus has been given alfalfa growing in widely separated parts of Minnesota. The new county of Lake of the Woods in the far north will increase its alfalfa growing area several hundred acres next year, says H. C. Lende, county agent. Wadena county farmers, to the west, have pledged themselves to sow more than 500 acres to alfalfa another year. Mille Lacs county farmers will do as well, says the agent for that county. Counties south and east are also getting the alfalfa fever.—Minn. Agr. Farm.

CONTENTS

Page

The Wheat Conference.
The True Farmer and His Task.
Balance Fertilizer 2

The Farmer's Lighthouse of Safety.
The County Agent With Good Pedigree 3

Wheat Price Adjustment at $1.50 per Bushel 4

EDITORIALS 5

Good Soil Feeder.
The Farmer's Vision.
Meat Standard Food.............. 6

Diversified Farming Benefits.
How to Preserve Manure.
Improve Farm With Hogs........ 7

Champion Corn Grower.
How Run Down Farm Was Built Up. 8

Experiments and Tests Show Need of Gypsum..................... 9

Serious Farm Labor Shortage.....10

Helpful Experiences.
Future of Wheat in America.
Fertilizer Returns Big Profit on Corn 11

Principles of Soil Fertility.........12

Sweet Clover Good Forage Crop.
Alfalfa Big Producer..............13

How to Determine Acidity.
Farmers Using Better Judgment in Fertilizer Purchases.............14

Lime and Fertilizer Needs in Indiana 15

The Farmer..........................16

When Should Lime be Applied?
Huge Waste of Straw.............17

Red Clover.......................18

American Farm Bureau News......19

Lime Facts for Livestock Breeders.
The Only Road to Prosperity......20

Sandy Soil Success.
Liberation of Plant Food..........21

Facts Concerning Manufacture of Fertilizers.
South Dakota Practice.
A Big Mistake.
To Fatten a Car Load.............22

THE TRUE FARMER AND HIS TASK

The farmer is the true type of th "human creator." He says "let ther be," and there is. The harvest is frui of "His will and his work." To hin who meets the first of human needs— the need of food—be thanks an praise.

The farmer stands at the doorwa and weighs out to each eater his loa In all ages the farmer has been th mainstay of the world. But for hin nations would be bankrupt and civilization would fall. And it is now o all times that the world needs his stabilizing influence. The farmers' stability of character and supreme common sense have been his chief elements of strength.

The world now needs most of a farmers whose courage and faith d not run low. The first furrow wa turned in the hope of a harvest. Ever seed planted has been in the fait that, though it died, it would liv again and bring forth abundantly.

The farmer needs to have faith i himself and in the future of his business. He must have confidence tha he can save the world and he can.

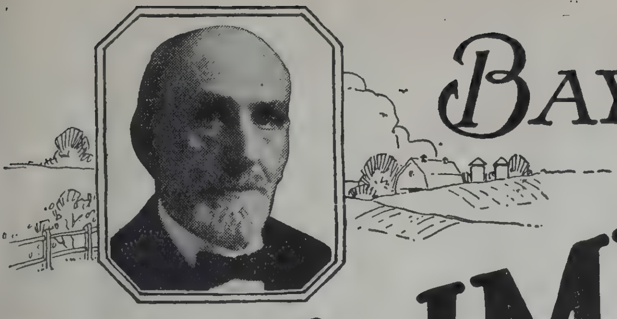
The farmer is in financial difficult it is true, but others face financi ruin. The farmer's burdens are heav but the burdens of millions of other are greater than they can bear. Wha then is there but cause for rejoicin and making glad that the opportunit has been given the American farme more than any other farmer to sav the world in its hour of greatest need

This further tribute to the farme will be of interest:

Imperial man! Co-worker with th
wind,
And rain and light, and heat, and col
and all,
The agencies of God, to feed an
clothe
And render beautiful and 'glad th
world.'

BALANCE FERTILIZER

"Large yields of corn cannot b had on half rations or on one-side or unbalanced rations. What bette illustration of a balanced ration fo corn that a well manured clover so to which has been added 300 or 40 lbs. of acid phosphate per acre Some comparatively new, rich land may carry close to a full ration a they stand, needing only a little phosphorus, perhaps, to put them i balance. But our low average yiel per acre is evidence that a vast acreage is being planted each year i which a full ration is unknown. Until these thin lands have been put i condition to grow good legumes, c can receive liberal applications c manure, it will be better to buy an use some commercial nitrogen an potash than to attempt to grow cor on them on half rations and put u with half a crop or less. Much c the expense incident to corn growin will be the same, be the yield 3 bushels or 60. To curtail the pla ration is to save at the spigot but t lose at the bung."—Ohio Farmer.



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW

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ol. 1 August 1, 1923 No. 2

HE FARMERS' LIGHTHOUSES OF SAFETY

The twin public institutions, agriultural colleges and experiment staons, are the salvation of the farms f the masses, and their hopes for the uture. The late ex-President Theoore Roosevelt a few years before his eath, in making researches among ld-time Roman literature, discovered here an ancient Roman historian had ttributed the downfall of Rome to the npoverishment of the soil of their arms, upon which the population deended for the production of their ood. There was evidently too much ttention given to politics, oratory, tatesmanship, law and military camaigns, and too little attention given o sustaining the fertility of the soil.

While in their great military trength, pursuing a war, conquering ther nations, and levying tribute and axes upon the conquered for the suport of Rome's armies and citizens, hey doubtless overlooked the humble nd drudging farmer of that day, as vell as the necessity of keeping up or ncreasing the yield as the population nlarged. Farming in those days was vith crude implements and little or o machinery.

Rome was without agricultural coleges and experiment stations, and the armers or farm laborers were not ooked up to or honored as in this ountry.

Our great body of common farmers n the United States, as they moved rom east to the west, in early days ursued a course of virtually mining he soil of its fertility. They folowed a plan of continuous cultivation nd one-crop raising, that weakened nd lessened the soil's yielding power ear by year, until approaching exaustion compelled the adoption of liversified farming and rotation of rops to hold and sustain the producveness of the soil.

The intelligent, able and forecful fficers and operators of these agicultural institutions are high instructors and bring to the aid of the farmrs the benefits of science and the nowledge of the most successful nethods of the wisest agriculturists. They also are engaged in investigatng and seeking valuable truths, testing and proving new methods of conduct of the various lines relating in some manner to the progress and advancement of the farmers' interest.

They are instrumental in developing and turning out a class of well educated young farmers, graduated and fitted for any position in life; but specially highly qualified for progressive, scientific farmers.

The seed thoughts have been planted that will give us a class of farmers of which the country can well be proud; they will show productions that will be the marvels of the age and that will awaken new life in farming communities and ambition that will produce new wonders.

The professors and life workers of these institutions will, by their magnificent achievements and worthy deeds of utility, shown by the advanced condition of the yielding power of the soil, establish lasting monuments to their memory.

THE COUNTY AGENT WITH GOOD PEDIGREE

The County Agent, molded right of good material, is one of the most useful, valuable and appreciated representatives of the farm interest that the husbandmen have ever been favored with.

He is likewise the farmers' friend; he is virtually on guard day and night to protect the farmers' interest. He is the busiest man in the county and is constantly on the alert, to stop some injury, or to secure some privilege that will be helpful to the farmers of the county. He picks up a good point and distributes it where it may serve many instead of one.

The County Agent organizes the farmers for selling their products of grain, fruit, vegetables, live stock, etc., etc., procuring better prices than were possible for farmers individually, and he saves in the expenses of marketing. The County Agent, by concentrating the orders for buying farm machinery, implements, feeds, seeds, fertilizers, etc., etc., can secure a pronounced saving for the farmers of his county.

The County Agent is comparatively a new official and is such a profitable and beneficial help to the county, that the wonder is, he was not thought of before.

His duties require energy, enterprise, industry and ambition to have the farmers of his county keep up their county line of progress with the front of the advance. He will see that the scrub sires are changed for pure breds in cattle, hogs and sheep. This work will continue until the herds and flocks are all pure bred animals and scrubs will be not only out of commission, but out of sight and out of the country.

The County Agent instills the progressive spirit into the farmers of the county. He endeavors to increase the fertility of the soil by the best methods as determined by scientific tests.

The County Agent will keep in close touch with the local county papers, which are taken by every farmer in the county and give much valued news through them of the doings in the county through his department, which will be eagerly read and appreciated by the farmers.

There are reported instances of some noble work of advice and encouragement in cases of distress of families, of widow and children, on account of death of husbandman, where they were on the point of giving up the farm; by following the agent's counsel, were enabled to manage and get on a solid foundation and prosper, both in a small way with dairy, chickens and crops and are now making a comfortable and desirable home in which all the children can be together. The oldest son could do the work, but did not have the age or experience to do the planning. There is seemingly no limit to the County Agent's usefulness.

GYPSUM INTRODUCED BY BEN FRANKLIN

In the early days the man famed for his great wisdom, Ben Franklin, was so strongly impressed with the benefits derived from the use of gypsum for producing plant growth, he used a novel method of introducing its qualities to the farmers in America.

He had a field of red clover that sloped down to one of the main roads out of Philadelphia, by which a stream of farmers' market wagons were daily passing.

On this field he sowed ground gypsum to form the following words: "Land Plaster Used Here. Ben Franklin." The luxuriant growth of clover forming the words, caused it to become conspicuous to the passers-by, in its dark green, vigorous healthy color standing out so prominently compared with its discouraged, short, pale green surroundings.

The name attached to it was an endorsement that carried weight of its real value, which was undisputed. A view of the outranking growth of the clover in the magic words was a double proof of its value.

Farmers desiring to know some important facts about gypsum and its use, should write the Secretary of the Gypsum Industries for a little booklet, rich with information, that is distributed free to those interested. Address Dept. 12, 844 Rush Street, Chicago, Illinois.

THE BERKSHIRE HERO IN OUR CLASS

N. H. Gentry, Sedalia, Mo., America's greatest breeder of Berkshire swine, writes:

"My Dear Old-Time Friend:

"Some time ago I heard that you were to retire to a much deserved rest, but upon reading the last number of the American Swineherd, which grew so great because of your guidance and help, I see you could not be content without an effort to be useful to others as in the past. I am sure the 'BAYNES' SOIL IMPROVER' is a monthly, which will interest the many.

"I want to be classed among your subscribers, therefore enclose subscription. I wish you the success you deserve."

We appreciate and welcome as a subscriber our true, long time friend.

ENCOURAGING WORDS

F. D. Colburn, Topeka, Kans., the scientific author and agriculturist, who served the state of Kansas so efficiently and faithfully for many years, distinguishing himself by his marked ability, writes us: "I have just received No. 1, Vol 1. of the Soil Improver. It is worth the price of a year's subscription, and I take pleasure in enclosing same herewith with my good wishes."

GLAD YOU CONTINUE WORK

Henry W. Lanz, Lake Charles, Louisiana, president of the Lake Charles Canal Co., was in the year 1885, a neighbor of the Editor of American Swineherd, in Alexandria, South Dakota, where the paper was founded 38 years ago.

Mr. Lanz has been a constant reader of the Swineherd since. He is engaged in his enterprise in Louisiana for a number of years in which he has been highly successful in draining a vast acreage of fertile soil.

He writes us July 7, 1923, as follows: "I am just in receipt Vol. 1—No. 1. BAYNES' SOIL IMPROVER. Very glad to learn you are not quitting after leaving the Swineherd, whose existence and success you are personally and solely responsible for. A great monument to your efforts and energy of a life work. May the new enterprise not tax you too heavily and afford you many years of pleasant and profitable occupation."

HIT THE RIGHT IDEA

P. C. Harlow, Washington C. H., Ohio, in sending in his subscription for "BAYNES' SOIL IMPROVER," says: "I think you have hit upon the right idea in your paper. If you could get your subscribers to state their methods of reaching success and the failures, to give the cause of their failures it would make a great paper.

Greatly increased crops are the reward of the farmer who handles the natural fertilizers of his stock to the best advantage.

Where land is cheap but fertilizer and labor expensive, green manuring is without doubt the most economical way of maintaining fertility, but cannot be compared with manures from stock fed on the farm under favorable conditions.

WHEAT PRICE ADJUSTMENT $1.50 PER BUSHEL

The business man fixes upon his product, manufactured or produced a price above the cost of production, to allow him a reasonable profit. This is considered fair and just by the public.

Then why should not the business farmer be allowed the same privilege as rightful and proper. Adopt the minimum price of $1.50 at which a standard bushel of wheat should sell for in Chicago, Minneapolis, Omaha, Kansas City, St. Louis, Louisville, Detroit and Buffalo markets.

The farmers' condition is a most inequitable one at this time, more so than any other class of our citizens. The wages of mechanics and laborers of every class are the highest they have ever been in this country and general business, industrials and railroads are classed as good.

The consumers therefore are well able to pay a higher price for their bread, in fact the bakers can afford to sell bread at present prices with wheat at $1.50 per bushel. The bakers have never lowered their price to compare with the drop in price of wheat. Heretofore general business depression or buoyancy, has affected all classes of business in a measure uniformly, while farm products are selling at a low point, in some instances below their cost of production. On the other hand, farm labor is highest and at its peak, thus cutting the farmer with a two-edged sword. The next point to solve is the method to put this in effect.

As we know, the Editor of this paper has expressed his faith in the management of the American Farm Bureau Federation, we therefore suggest it as a most suitable organization to carry out this marketing plan. They have the true interests of the farmer at heart, and can safely be trusted. They are national in extent in their operation.

President O. E. Bradfute has said: The "American Farm Bureau Federation and co-operative marketing, must go hand in hand." Every State Farm Bureau is asking for a definite metho of carrying out the get-togethe policy as was shown in July issue o SOIL IMPROVER. A short tim ago there was a report published tha the American Farm Bureau ha bought the Armour Company Grai and Elevator business; had it bee true, they would have been equippe for the operation.

It requires a unison of the farmer to act in acord to carry out this process, which can be done by the American Farm Bureau Federation bes being an organization in operatio and in line of the purpose of the organization. They could purchase o establish elevator plants for a grai dealers business.

According to estimates on July 1 o the United States department of agriculture the American growers will produce 821,000,000 bushels of wheat thi year. In addition, there is on hand left over from 1922, according to th same sources of information, 36,000,000 bushels on farms, 36,000,00 bushels in country mills and elevator and 29,000,000 bushels in visible supply markets, a total of 101,000,00 bushels to add to the vast volume o new wheat.

The annual consumption of whea in the United States is estimated t be 550,000,000 bushels and an additional 100,000,000 bushels is required fo feed and seed. This leaves 272,000,00 bushels for export.

There has been a decrease in th world's wheat supplies of 170,000,00 bushels since March 1, compared wit 130,000,000 bushels for the same tim last year, and of 124,000,000 bushel for the same time in 1920. Presen world supplies July 1, as given by th Daily Trade Bulletin of 171,996,00 bushels are the smallest for July since 1916, with the exception of 192 and 1921.

The 550,000,000 bushels to supply the consumers demand, the price o which could be fixed at $1.50 pe bushel of full grade wheat. Unde the present method of selling, the export surplus controls the price of the much greater amount of wheat fo home consumption. The Bureau coul carry large quantities of the surplu stock in elevators as it is likely the next crop may be a deficiency which would clean out the surplus stock The world would know they coul always get wheat in United States a of old in Egypt.

The Bureau could have elevator in one or more of the best Europea ports where they could sell exporte grain without the poor European conditions disturbing the markets in the United States if necessary.

This price at the market cities o $1.50 per bushel would make an average net to the farmer after paying freight and expense and small profi for the Bureau of 35 cents a bushel o more than the farmer would receiv July 14. This would amount in all to one hundred and ninety million dollar more than they would get at presen price.

I ask the Editor to publish this outlined framework of program for aiding the farmers as it will be as great a benefit to the farmers at this time as improving the soil, which is laudable purpose.—Your Subscriber—Al Dirt Farmer.

BAYNES' SOIL IMPROVER

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EDITORIALS

FARMERS PROGRESS

The methods of work upon the farm have undergone great changes since 1855, when the Editor was an active full hand on his father's farm. We felt pretty proud at fifteen years of age leading six farm hands keeping stroke, mowing with scythes.

There has been a constant improvement by inventions of farm machinery and implements. Horse power taking the place of hand power, and the horse now superseded very largely by the motor.

The scythe, sickle and cradle are retired for the mower and reaper with self binder attached. The single furrow plow guided by the man walking in the furrow is defeated by electing the riding plow turning over two or more furrows, drawn by a motor. Every branch of the agricultural work has experienced just as radical changes of advancement as these few mentioned.

This enables a single man to accomplish more work than was done by four formerly. It relieves the laborer of the slavish drudgery and dignifies the farm work.

Everybody is compelled to acknowledge that the soil is the heart of the farm, and performs the real purpose of the farm in producing the subsistence for the lives of the people.

Yet with all the essential importance of the soil, the ordinary farmer has given it less study than any other department of the farm.

The farmer can well be proud of his work. Farming is the greatest vocation in the world. The farmers are the backbone of the country. The farmer who guides his work with the light of his best thoughts is the scientific farmer who attains success and adds to the supply and glory of the Nation.

We entreat all farmers to join "BAYNE'S SOIL IMPROVER" class of subscribers and all work together in advancing the best interests of the soil.

SELF-RELIANCE HELPED SUCCESSFUL FARMERS

The successful farmers you will find are much helped in their practice, plans and methods by their natural self-reliance.

The successful farmers have the ideas, and follow them out, because they have resulted in success heretofore and then have become adopted by them.

Secondly, among all of these efficient farmers, there are no two of them who farm precisely alike, yet they all reach success largely and chiefly by self-reliance.

There is no doubt that they are, in some particular, making slight changes as time progresses and brings to their views results which they look into and find are caused by certain things, which they change to meet the new developments. This shows that they are farmers who do not remain in the rut, as there are some people who are farming and handling their farms as their great-grandfather did, until the rut is worn so deep they do not try to get out of it.

These successful farmers' methods will be found, upon close investigation, to have a general foundation of similarity in the most essential things, while the variableness does not really affect this foundation. Their success must be attributed to their self-reliance.

They get all the instructive information they can, but they do not stop here, because they digest it, give it thought, reason upon it, and compare it with the results that they get from certain farming, thus relying upon their own good hard common sense and progressive ideas, which brings with it success, and this does not quit but continues as long as life lasts to meet the continual changes and variations of localities and requirements.

The man who depends on someone else never seems to possess any real knowledge himself, but has to go each time to secure what he needs from some other person, upon whom he is depending, and therefore does not, or can never expect to reach success. It is all right to get the benefit of all the experience of others, but you want to assimilate it and thus make it your own. Go into it deep and search for the reasons that made it a success and then you get the benefit of the experience without the cost that it caused the original receiver of it. Therefore we can truthfully say that the real cause of the success of these farmers is the fact of their self-reliance.

EXPERIENCE PRACTICAL WISDOM

Experience is rich knowledge, it is educational. It has a bankable value according to the extent and quality of the experience. A good will consists very largely of experience which has guided to a success.

There is a cost in producing experience, it requires time, labor and cash. The originator of it sustains or is liable for the expense in making it. It can be used thereafter by all who have it, free from further cost.

The United States, State Agricultural Departments, and the Agricultural Colleges and Experiment Stations have scientists engaged in research work. They are making tests for the discovery of important and valuable facts pertaining to agriculture at the Government's expense. This experience is winnowed for the good and useful, for the free use of the farmers.

The party who gets the benefit of the other fellow's golden experience free of cost in many cases does not realize the great advantage it is to him. It has ofttimes been the valued knowledge thus received that was the real foundation of the success, that enabled the party to own the good farm and home.

The experience of the man who increased his yield of corn and wheat one-third, put into practice by others will accomplish about the same for them. Some may excel the yield, while others may drop under. But the advantage of the use of the service is readily recognized by all.

The crops of experience are ripening every month. Subscribers for "BAYNES' SOIL IMPROVER" will secure these harvests. Take advantage of our offers and notify your neighbors; no farmer should miss a copy.

SUSTAINING FARM CAPITAL

The value of the farm is established by the soil's productiveness, with the improvements added thereto. Every crop that is taken off the farm is at the expense of the land's fertility, decreasing it that much. The adoption of the single crop line of farming, such as growing wheat or other grain, cotton, sugarcane and so forth, and then selling the crop for shipment, brings about the most rapid exhaustion of the farm's yielding capacity and deterioration of its value. It is virtually retailing the farm through the markets. The farmer or planter who follows this system, unless he fertilizes the fields each year from which the crops are taken, to maintain or increase the productiveness, can figure out the time of his sure failure.

This is world-wide experience, that a country whose farmers neglect to keep up the richness of their land will bring about the certain failure of themselves and the downfall and ruin of their country. The Roman empire more than two thousand years ago, before their soil had been robbed of its richness, by the abundant yield of its crops built up the strength and prosperity of the empire until Rome ruled the world, and the Roman farmers, intoxicated with their tremendous power, in their pride disregarded, slighted and impoverished their farms.

An old historian has recorded the fact, "That the downfall of the mighty Roman empire was caused by the exhaustion of the productiveness of its soil." This terrible warning does not seem to prevent 25 per cent of our farmers following the same course. They may be like the farmer on taking a meal on the dining car, who, upon being asked if he would have oxtail soup, wished to be excused, as it was too far back.

We have the experience nearer home, and of later date, that we should not atempt to dodge, for it is the part of wisdom to take into serious consideration for our own protection and benefit. In the past one hundred years in our own country, the deep, rich, productive soil of our beautiful valleys and grand prairies from New York and Pennsylvania, west through the states, was so tempting to our first settlers that they pursued a course of raiding and gradual spoilation of their own property. The yields were so bountiful and came so easy that they did not consider the future, except the minority of perhaps less than one-fourth of the pioneer farmers, who wisely preserved the original fertility supplied by nature.

The time has now arrived when we are compelled to insure our future safety, to adopt and practice not only a defensive, but a progressive course.

Diversify in the crop growing, rotating corn, oats and wheat, as principal grain crops, with alfalfa and clover as the two chief legumes, as they are valuable forage and two of the greatest suppliers of nitrogen to the soil. They are regular savings banks for accumulating the deposits of fertility.

Then carry live stock of horses, cattle, sheep and swine to consume all the feed grown on the farm, both of grain and forage, excepting wheat, [illegible] you should buy more than the [illegible]lent of the bran and middlings [illegible] carried in the wheat sold, for feeding.

This is one of the first conditions to organize for, as one of the cheapest ways of contributing to the maintenance of the soil productiveness. There should be extra care taken of all the manure, saving it and hauling it onto the fields. Have a regular system of manuring a sod field for corn, and in the following Spring sow to oats, which will do very well on the strength of the manure supplied for the corn; after the oats is taken off, it can be plowed for wheat and a proper fertilizer applied on second plowing. Different soils require distinct fertilizers, and it is necessary for each farmer to acquaint himself with the needs of his soil. The application of the proper fertilizer for the enrichment of the soil is highly phofitable. The same labor will be recompensed with increased yield, ofttimes the crop will be doubled, and when once started in good on the upgrade, will keep improving and adding to the value of the farm. This will be "Making two blades of grass grow where one grew before." With generous increases in all of your grain crops and saving you from buying so much of the feed for your grain crops and saving you from buying so much of the feed for your live stock, and at the same time adding to the enrichment and yielding capacity of the farm, this will be intense farming.

GOOD SOIL FEEDER

The good farmer must be a good soil feeder to be a successful crop raiser. There is some similarity in feeding the soil and being a good live stock feeder to be a successful breeder.

It is proven that crops of grain, grass, vegetables, tomatoes, potatoes, etc., by the use of the proper fertilizers judiciously and amply supplied, not only increases the quantity but improves the quality of the yield.

There are some other points to look after as well as the fertilizing department. The seed should be pure bred and fully developed, matured and as near perfect in quality as possible. The preparation of the soil should be in proper condition.

The farmers once considered much cultivation highly beneficial to the growth of the crop. There were some who contended that the deep cultivation was liable to injure by breaking the corn roots. The scientific farmers now inform us, cultivation's highest service is as a destroyer of weeds. These weeds live on the fertility of the soil, sharing it with the corn, to the corn's injury. The corn scouts of Ohio in 1922 cultivated their corn from none to five times. Two of them that raised over 100 bushels an acre only cultivated it twice over.

THE FARMER'S VISION

A little over a decade ago an Illinois farmer with a vision suggested the organization of the American Farm Bureau Federation.

Again the necessity arises for a further relief of farmers in the selling of their product, especially wheat, the bread making food for the pepole of the world. A dirt farmer comes forward with a vision lighting the way for the farmer to save loss in growing the needful bread making crop. This is published in the August issue of the "BAYNES' SOIL IMPROVER." It would aid the farmer without harming the consumer and equalize the farmer with other branches of business.

MEAT STANDARD FOOD

To develop standard bodied people they should be favored by eating a balanced ration. The army meat ration for full-grown man is one pound and a quarter a day of fresh meat, or three-quarters of a pound of bacon or ham cured meat. The Chinese are a race of non-meat eating people by compulsion. The density of the population is so great that the country is unable to supply them with a meat ration. Hence they are a race of people of small stature by being deprived of meat for ages.

The same rule governs cattle and horses on rich, luxuriant pasturage in the wild state produce the large size, and those in sections where the forage is poor on barren soil are dwarfed in size.

Meat was a chosen food in the earliest biblical days, and among the favored and honored patriarchs of old were herdsmen and shepherds engaged in raising herds of cattle and flocks of sheep for the production of meat food. Psalm 104, verse 14,—"The Lord causeth the grass to grow for the cattle, and herb for the service of man that he may bring forth food out of the Earth."

"Meat contains a large amount of proteins, which are body-building substances, in a form easily digested and readily assimilated by the body. It also contains vitamins which are necessary for the normal growth and vitality of the body."

The choice beef steaks and roasts;
the delicious pork chops, juicy tend
loins, roast tasty spare ribs, fine fla
ored sausage, rich savored bacon; t
luscious roast lamb and chops. The C
my, spring chicken frys (a la Southe
style), the Christmas roast turke
goose, duck, and many other palatab
prepared meats are tempting enou
to induce every human being to pa
take liberally thereof without urging

What is the non-meat eater's ide
all this grand production of power
energy and mind building meat foo
is intended for, if not human subsis
ence. We have no objection to a
party whose taste prefers eati
onions and radishes. But we object
their preaching this doctrine to tho
who favor balancing their ration wi
meat. The Editor is an 83-year-o
balanced meat eater still at wor
Meat is a human food, it is natur
law from the beginning, unamendab
and unchangeable.

FIRST 100 SUBSCRIBERS

There was a nice little race to enl
in the first hundred bunch of subscri
ers for "BAYNES SOIL I
PROVER" reaching the Chica
office. They were all from our lo
esteemed subscribers of the Americ
Swineherd, and were highly appr
ciated by us. They each enclosed clu
of eight subscribers for our new pap

The first club was Robert C. Hen
Sheldon, Iowa, and then in the fo
lowing order: L. R. McClarnon, Bra
dyville, Iowa; Walter E. Iva
Franklin, Ohio; E. E. Gardhou
Palmyra, Missouri; Jennie M. Conra
Conrad, Indiana; Harry F. Adam
Castleton, Illinois; Ed Klever, Bloo
ingburg, Ohio; J. F. Hulen, Central
Missouri; W. Luther Baynes, Charle
town, Indiana, W. A. Scar, Earlha
Iowa; Henry Kelting, Martint
Illinois; A. B. Brown, Alexandria,
D.; Lewis J. Baynes, Salem, Indiana.

These were received by us with
four days from the first to the la
They are from six states.

The subscribers have been reachi
us since, covering the United Stat
and a few foreign. We gladly welco
them all and we hope to give the
the full worth of their money. W
solicit the subscription of eve
farmer and his neighbor.

100 BUSHELS CORN AN ACRE

The progressive corn growing far
ers of Ohio who won the victory
producing one hundred or ov
bushels an acre average for a ten ac
field have a right to be proud of the
accomplishment. It is a practic
demonstration of what can be do
with proper efforts of mind and mu
cle. The achievement itself is co
clusive proof of its attainment, a
mitted by all.

The state of Ohio has truly be
honored by these expert corn gro
ers of the nation's most popul
grain, the native Indian corn. T
state agricultural department shou
recognize the efficiency of these far
ers producing a thousand bushels
corn or over on ten acres of land,
medal of merit.

For the year 1922 there are 19
the class of expert corn growers, b
some of them are a few bushels und
the hundred, but are virtually for pra
tical purposes worthy same credit.

The farmer, William Gilmore, of icking county, producing the larg-st yield, 134.31 bus. average per acre n the ten acres, is claimed to be the rgest published yield grown in the nited States. This variety was Voodburn's. It was planted May 23, grains in hills. The preceding rop was red clover and sweet clover; e distance between hills was 36 nches by 33 inches; it was cultivated wice. Amount of fertilizer per acre sed 500 lbs. 18 per cent and 500 lbs. 0-10, and 20 loads of manure.

I. C. Marshall produced 105.71 bus., lanted May 11, 4 grains in the hill, of ellow Dent. The crop preceding vas corn, the 1922 crop was planted grains in hill, 36 inches apart each vay. It was cultivated five times, no ertilizer or manure used.

E. F. Johnson, Williams county, ield was 106 bushels average per acre n the ten acres planted June 3 in rills 36 in. between rows and one rain every 11 inches; it received no ultivation; the variety was Clarage. he crop was preceded by wheat and weet clover and there were 230 lbs. 6% fertilizer used per acre but no nanure.

Five of the parties variety planted vas Yellow Dent and three were eid's Yellow Dent, two Johnson ounty White, two Woodburn's Yel-ow Dent and the champion yield was Voodburn. Ten of the preceding rops were clover.

These clever, superior corn growers vill furnish the examples for hundreds f other farmers to follow. There vill be efforts made to exceed the 922 champion yield. You can get ome good pointers by subscribing for he "Baynes Soil Improver." At the nd of the year you will say it is the iggest value for a quarter you ever eceived. Get busy and act!

DIVERSIFIED FARMING BENEFITS

The farmer engaged in diversified arming throughout, that is, have a airy, horses, hogs, sheep, poultry, aise wheat, oats, corn, potatoes, tur-ips, cow peas, soybeans, clover, al-alfa and timothy. Such a farmer vould be well equipped to wear the itle of diversified farmer.

There are some farmers who are lassed as diversified because they aise grain and live stock, which may nclude only a dairy or some other pecialty.

The first mentioned has some ac-ruing advantage in the way of prod-cts for market along all through he season. This furnishes cash which omes in quite convenient and the mounts accumulating enlarge the re-eipts of the season to surprise one. he dairy where the cream is taken laily by the creamery, there is the nonthly check. The separator milk s feed for pigs and poultry. The oultry in return lay fresh eggs daily vhen they are the highest price and ater on have the young frys. The heep have their wool sheared in pring; a flock of fifty ewes will have nore than that many lambs, one-ourth of them may have twins; they urnish high price meat for market. he hogs will supply two crops of ork hogs for the year and being pure breds, may have some extra breeders that will sell at four or five times the pork hog price. There should be one or two colts a year ready for sale. The wheat from well manured and fertilized field should yield a good crop, all of which would be marketed except for seed.

The corn, oats, cow-peas, soybeans, clover, alfalfa, and other hay are fed on the farm. The potatoes and turnips in planting for home use can at the same time have an extra one or two hundred bushels for market. This will maintain the soil's productiveness and pay the farmer.

Jas. Baynes in his 83rd year of age, Editor of Baynes' Soil Improver, in the harvest field

HOW TO PRESERVE MANURE

Which is better to use on manure from dairy cows which are fed on cement floor? Hydrated lime; acid phosphate, or gypsum? The manure is hauled twice a week direct to fields.

I have been using hydrated lime to keep down odors and keep flies away, but manure does not seem to do any good where lime is used on it. The smell of ammonia is very strong on both liquid manure and solid. Liquid manure is collected in underground cistern and hauled to land about once a week. I need the fertilizing value of manure very much; how can I preserve it? O. E. W., Yorktown, Texas.

In Answer—Of the three materials mentioned, namely, hydrated lime, acid phosphate, and gypsum, I would consider the use of acid phosphate as the best to use with the manure. Hydrated lime is somewhat active chemically and will liberate and release considerable nitrogen in the form of ammonia. Gypsum is a more or less insoluble compound but does have some power to combine with the nitrogen in manure, producing ammonium sulphate, which is not so easily dissipated from the manure. The acid phosphate, in addition to the phosphorous which it contains, also contains gypsum. Therefore, the use of acid phosphate will accomplish the same thing which gypsum itself would accomplish and in addition re-enforce the manure with the element phosphorus, which is an important plant nutrient. Manure in itself is somewhat unbalanced with respect to the nitrogen and phosphorus which it contains and re-inforcement with phosphates has often been found exceedingly valuable. Rock phosphate has also been found to be a good material to re-enforce manure with. Either acid or rock phosphate will undoubtedly be found to be valuable for use with manure.—F. C. Bauer, Associate Professor, Dept. of Agronomy, College of Agriculture, Urbana, Illinois.

CORN VS. WHEAT

Corn is giving wheat a hot race in price, wheat 97 cents and corn 83 cents. Where 35 bushels of wheat, 80 bushels of corn would grow. The wheat would bring $33.95 and the corn $66.40. The corn could be ready for market at much less expense per bushel.

IMPROVING THE FARM WITH HOGS

One of the main duties of every farmer is to maintain and improve the fertility of the soil, enabling it to yield larger crops continually. The productiveness of the soil is the foundation of the farm. It is that which gives the increase and the interest on your holding, through its production.

There is no easier way to maintain or increase the fertility of the soil than by live stock, and no class of live stock are ready so soon and have so much power in restoring productiveness and maintaining the fertility of the soil as hogs. The man who raises wheat, cotton or corn and sells this product from the farm, is virtually selling the value of the farm, and unless he supplies the fertility that is being extracted, it will in time become impoverished and unprofitable to own.

The theory of returning to the farm the manure possible to be made from the crops grown from it ought to have more consideration by most of us. The theory has much of value, but in the common practice the theory breaks down, not because of its defects, but because it is not fairly and persistently practiced.

So long as the hog does not assimilate more than 15 per cent of the grain he consumes, to form his frame and upholster it with flesh and fat, we ought to have returned from this source to the farm 85 per cent of the fertility taken from the soil. As the finished porker leaves the farm, he carries beyond its reach, thus, 15 pounds of every 100 pounds of the elements stored in the grain and grass he has consumed.

This necessitates the feeding of the hogs in a manner and way that the manure can all be saved and returned to the soil. The man who feeds along the banks of a stream or on a hillside, so that the feeding place may be kept clean by gravity and the washing of rains, certainly has no conception of the value of hog manure and the theory of returning faithfully and honestly to the mother earth the riches he took to grow his hogs. There are millions of dollars' worth of fertility washed away along the creeks and water courses where hogs are fed, to be handy to water and to be kept out of mud and filth incident to the average feed lot. This waste is unnecessary and can be avoided. A little planning and building feeding floors, where the manure can be saved, or else in feeding a while on the thinnest land and then changing the feeding places as the condition of the soil demands, will conserve the most of the 85 per cent of corn and mill feed and other feed given to the hogs. More can be saved by feeding on a clover sod or even a blue grass, than by feeding on bare ground, since the living plants assimilate quickly soluble portions of the excrement and urine from the herd.

By care and proper management, the farmer who has been producing either cotton or grain and selling the products from the farm, can, by diversifying and rotating, build up the fertility of the soil by this method of live stock feeding, and thus constantly improve the value of his land. The other method of disposing of the products is one of continually robbing the farm of its value and lessening its power of productiveness.

WEBSTER ON FARMING

Daniel Webster made the following statement concerning farming and the business of agriculture:

"Let us never forget that cultivation of the earth is the most important labor of man. Unstable is the future of a country that has lost its taste for agriculture. If there is one lesson of history which is unmistakable it is that national strength lies very near the soil."

JUST WHAT WE NEEDED

J. C. Russell, Associate Professor in Dept. of Agronomy of Nebraska Agricultural College, writes: "Enclosing eight subscriptions for 'BAYNES' SOIL IMPROVER,' copy of which just arrived.

"I was just thinking the other day that it would be a splendid thing for the American farmers if a Magazine should be established that is devoted entirely to the subject of soil improvement. I notice that the sample copy which you sent me is No. 1 of Vol. 1 of such a magazine. Several of us were talking of agricultural papers and we agreed that one of the present needs of the American farmer is for agricultural magazines and newspapers which are absolutely independent of subsidy. I notice that the first issue of your paper has no other advertisement in it than a few pages which advertise the magazine itself.

"It is with extreme pleasure that I send you my subscription and I trust that this little magazine will continue to exist and that its subscription will grow until every farmer in the country is reading it. However, if you will allow me, I should like to make some comments about the policy of such a magazine.

"First—It should be free of any taint whatsoever of control by any industry other than pure farming. I do not know if it will be possible for any magazine to run without advertisements.

"Second—It should not be an organ of propaganda for any fertilizer company.

"Third—It should give competent interpretations of the findings of Agricultural Colleges and Experiment stations.

"Fourth—It should continue to exist as practical as the first copy seems to be.

"If your magazine can run along these lines I believe that it will be one of the finest things that has ever been done for American farmers, and I assure you that I will be glad to do all I can to further it in the way of contributions and recommendations."

CHAMPION CORN GROWER

W. H. Gilmore, the Ohio farmer who raised 1,343.1 bushels of air dried shelled corn on his ten acres in the year 1922, this making the third year that he had averaged 100 bushels per acre.

One of the reasons of his success is the fact that he is not self-conceited. He is anxious and searching for greater knowledge. He has subscribed for "BAYNES' SOIL IMPROVER" and is hoping to get the benefit of some other person's experience. He is built for a winner and not a quitter.

FARM BUREAU COUNSEL

The American Farm Bureau Federation has among its members many level headed, far-seeing advisers for consultation, and none who are more prudent, wiser or richer in experience that ex-President J. R. Howard. His devotion to the interests of the Bureau, through the two terms of his service contributed to its advancement. He is on the list as one of the prominent lecturers.

DON'T GROW DISCOURAGED

There may be some farmers who are not familiar with the scientific terms of the elements required to restore their soil to a proper state of fertility, when first facing the needs presented in a technical manner to be overawed and discouraged.

There is a way to approach this matter so as not to throw the party out of gear. One farmer gives us his plan by starting in by growing clover, alfalfa, cowpeas and soybeans. In Wisconsin most farmers have found soybeans the best of the legumes to yield on light soils.

Make a strong effort to save manure and increasing the amount, use all the straw for bedding. Don't allow manure to lie out where it may be rained upon, as much value leaches from it and is lost. These steps will be helpful to the soil, they enable one to feed it with the manure and by plowing under a crop of legumes when matured, turning it an inch deeper than before.

Study each step taken, be sure th
the legumes have the nodules or kno
on the roots, and they perform th
work of gathering nitrogen from th
atmosphere. In the event they shoul
not, the County Agent will be able t
give the practical plan to supply wh
is necessary to put the legumes i
working order.

The farmer becomes intereste
more and more each month, as h
takes his progressive steps. Read u
the experience of the successf
farmer on the various procedures o
which he based his success. There
one good point here, your using th
party's methods does not deprive hi
of the use of them.

The work of building up and r
storing the fertility of the soil is s
elevating that it becomes a real e
joyment to the farmer.

The successive steps are taken wit
assurance and confidence until the o
erator becomes an up-to-date, succes
ful farmer using scientific methods.

HOW A RUN DOWN FARM WA BUILT UP AGAIN

When a farmer blazes the way f
his community in matters of so
building, when he not only sets the e
ample, but unselfishly does everythin
he can to get his neighbors to ado
better methods, when gradually h
farm becomes the seed of inspiratio
which grows into a community
better farms—then indeed he ha
reason for satisfaction, and is deser
ing of the highest honor as a soil
leader.

Ohio is fortunate in having sever
men who will come up to these spec
fications. Probably none is mor
worthy of mention than Mr. Milto
Wallace, of Mahoning County. Com
ing into possession of a "run-down
126 acre farm in Goshen township, i
1918, Mr. Wallace started in by ge
ting in touch with his county agen
Mr. Lehman, who in turn called upo
Mr. Bachtell, at that time one of t
soils extension specialists. Togeth
they worked out what they thoug
would make a real program of so
improvement. When the communit
soils demonstration project wa
started in 1919, a 16 acre field lyin
along the road was made a demo
stration field. Its treatment an
record is representative of what
being done on the whole farm. I
1918 a twelve acre piece of po
poverty-grass pasture was taken f
a pasture improvement demonstratio
and given a treatment designed
start it on the road to better thing

The results which Mr. Wallace ha
accomplished on his farm have bee
the inspiration leading to the adoptio
of similar methods on the farms of
large number of friends and neighbo
who have visited his farm and o
served what he is doing. This ye
his farm has been a "mecca" for ea
of the groups of men who have a
companied the series of pasture tou
which have been held in Mahonin
County. We believe every man wh
has visited Mr. Wallace's farm h
gone home with some new and val
able ideas.

Here is the story of his two de
onstrations: The community de

onstration field is growing a three year rotation of corn, wheat or oats nd clover. Only one crop of hay is ut, the second crop being pastured nd then turned down for corn. The ield has already had two applications of limestone of around 2 tons per cre, one in 1918, and one in 1921. Acid phosphate is used at the rate of 00 pounds per acre on the wheat, and 250 pounds on the corn. The corn gets manure at a rate of about loads per acre. The wheat yielded 9 bushels per acre in 1919, and 31 bushels in 1922. Corn gave 12 tons of silage per acre in 1921. The clover n 1920 cut better than 2 tons the first utting with an estimated second crop of over a ton which was pastured. The field has one of the best clover rops on it this year that we have een in the state.

The 12 acre poverty-grass pasture got an application of 2 tons of limetone screenings and 200 pounds of acid phosphate per acre in the fall of 918, and nothing else, then or since. The whole treatment including the abor of application was estimated to cost around $10 per acre. No seed was put on. Today it is as pretty a blue-grass—white clover pasture as ever grew in the limestone regions of Virginia or Kentucky. In 1919, ogether with 20 acres of adjoining untreated woods pasture it supported 2 head of cattle, in 1920 14 head, in 921 16 head, in 1922 20 head of cattle, 0 head of sheep and 3 horses. Although apparently the pasture is still mproving, Mr. Wallace expects to give it another application of acid phosphate this year.

It is difficult to estimate what a power for good this work of Mr. Wallace will be in Mahoning County as time goes on. We need a lot more men like him in Ohio.

Very truly yours,
Firman E. Bear,
Specialist in Soils and Crops.

The foregoing was mailed by the Dept. of Soils, Ohio College of Agriculture, June 26, 1923, to the Ohio Soil Leaders.

SUBSOIL ENRICHED BY LEGUMES

Alfalfa and sweet clover are well adapted for enriching the deeper layers of the soil. Plowing sweet clover late in fall leaves large amounts of plant food in the subsoil. Plowing in he spring in preparation for corn likewise leaves large amounts in the subsoil. Alfalfa roots naturally go deep, and alfalfa ground may be plowed at any time with the assurance that the subsoil has been enriched in humus and nitrogen. On many soils it is preferable to start enriching the land by sweet clover, but on those soils where the surface layer is already rich alfalfa may be used to advantage.—Agricola.

Manure carriers and manure spreaders are twin brothers to facilitate the handling of barnyard fertil- zers. With this equipment manures can be hauled daily to the fields without loss by leaching and fermen- ation.

EXPERIMENTS AND TESTS SHOW NEED FOR GYPSUM IN VARIOUS PARTS OF THE UNITED STATES

By Professor George A. Olson

The results obtained with the use of gypsum in the western states are only parallel to those obtained in central and eastern states. The western results, however, may be considered of special interest because they show that gypsum is a far more important plant food than anyone previously supposed it to be. Furthermore the results were obtained on lands of unusually high fertility.

The Wisconsin Experiment Station determined the sulphur content of a number of the most common crops grown on the farm, and found that plants utilized considerable quantities of sulphur. Some plants contained nearly as much sulphur as phosphorus, while others—the legumes, for example—contained more. As a result of this study a general interest in the subject was created.

Previous to the investigational work mentioned above, Dymond, the English scientist, made some startling statements. "There is not enough sulphuric acid in the soil or supplied by rain for heavy yielding crops rich in albuminoids, either for the production of greatest yields or highest feeding value, and for such crops it should be included in the artificial manure." The western experiments conclusively show that the scientist's interpretations are correct. Similar findings have been reported in various parts of continental Europe, Asia, Africa and Australia. But we are perhaps more interested in the results obtained by farmers in the United States.

In a certain section of Missouri the farmers had given up hope of ever being able to grow alfalfa. They stated that it couldn't be done and that it was a waste of time, money and seed. There was failure one year after another until gypsum was applied and the farmers found that they could obtain excellent yields with the use of this material.

A field of clover growing on a rundown farm in Iowa was treated with gypsum two years ago and the farmers who saw the field after the treatment stated that they had never seen any clover in Iowa that looked better. In fact the owner stated that an average good crop had not been obtained from this field during the past twenty-five years until it was treated with gypsum. Increases have been noted in other fields, thereby showing conclusively that the sulphate sulphur in Iowa soils is steadily vanishing. In the northern part of Minnesota, increased yields of alfalfa have been obtained through the use of gypsum, and it is evident that there is a general need for this material in view of the fact that farmers are realizing that cereal production must be stabilized. The legume plan saves the soil for the time when cereal growing will be worth while.

Very little gypsum has been used In Illinois and Indiana, but the farmer's future problem will be the feasibility of continually growing corn and wheat. Many of the soils are too low in sulphate sulphur for the successful growing of alfalfa. In Ohio, application of gypsum have frequently increased the yields and the fertilizer experiments conducted in that state show that sulphur must be provided.

At Freemon, Ohio, the yield of alfalfa was increased 100 per cent with gypsum and similar results have been reported in other sections of the state. In fact, it is expected that the Ohio River Valley will some day require large quantities of gypsum because recent findings show that sulphate sulphur is rapidly disappearing from these soils.

In Michigan, New York and elsewhere, we have learned that gypsum has been a means of assuring good yields of alfalfa. Gypsum has also been applied to the land for other crops very successfully and the data being collected show that the sulphur problem is not limited to the growing of alfalfa or to any one section of the United States.

Gypsum is also used in ways other than as plant food. A new use for gypsum on the farm is as a preventative or reducer of potato scab. It is also very valuable for use in preserving the nitrogen in manure. In the peanut section where the big meaty peanuts are grown, large quantities of gypsum are used. The day is not distant when the cotton grower will also use it.

Finally the possibilities of utilizing gypsum with rock phosphate and other kinds of plant food should be considered. Some very interesting results have been reported.

CORN MISSOURI FARM KING

Corn is the farm king in Missouri, according to Samuel M. Jordan, the well known corn authority of the State Board of Agriculture. In a radio broadcast Mr. Jordan says that "Since corn is by far Missouri's biggest crop, it requires illustrations to show its immensity."

If we could just add one more bushel to each corn acre in Missouri, and put it on the market at the present price of 80 cents per bushel, it would pay the first cost of the new state capitol, and leave enough more money over to pay the Governor's salary at the present rate for the next 300 years, and in addition, pay the subscription for every farmer in Missouri for ten years for "Baynes' Soil Improver" from which they would receive instructions to enable them to add ten bushels to each acre before their subscription expired.

"Corn buys more farms, and pays off more mortages than all other crops; it buys more automobiles, more pianos, and modernizes more homes than all other crops, for it is corn that puts the pig and the sheep and the steer on the top of the market; it is the main part of the average ration of the dairy cow, and the little brown hen; and what would Sambo do without his Johnny-cake? The pig or the steer's best recommendation when he goes to market is that he has been 'corn fed.' Corn does most of these things, however, indirectly. In other words, it goes to market very largely 'on foot.' It then foots the farmers' bills."

DON'T FORGET

That carfully saving the manure and depositing on the soil increases the fertility and value of the soil. It is the savings bank of the farm.

That alfalfa, clover, soy beans, cowpeas and other legumes will labor for you free of cost; they will even pay their board in gathering nitrogen from the air. They double Judge Gary's 12 hours a day, through the growing season. Keep some of them employed.

A farm with a barren soil gives no reward for your toil. While productive, fertile fields enrich you with their big yields.

That live stock on the farm are most helpful in keeping up the fertility by feeding the product of the farm to them, thus saving a good per cent of the fertility used in its production.

Weeds are rampant feeders on the fertility of the soil; they have voracious appetites. They are regular bandits. They are enemies of the farmer, and should be destroyed and completely extirpated for the benefit of the farm and profit of the farmer.

That every farmer in the United States should be a reader of "BAYNES' SOIL IMPROVER." The subscription price is only twenty-five cents a year and it will not be the paper's fault if the subscriber fails to get the biggest value he ever got for a quarter of a dollar. You take no risk; make hay while the sun shines.

Don't forget that the "SOIL IMPROVER" every month can put you next to a good thing; take advantage of this knowledge.

"FEEDS & FEEDING" 25th ANNIVERSARY EDITION

Every farmer interested in live stock, who has reached success, realizes the importance of "Feeds & Feeding." There are others who fail to succeed, who attribute their disappointment to a deficiency in knowledge of one or the other or both.

The introduction twenty-five years ago by Professor Henry, of his book entitled "Feeds & Feeding" was a revelation of knowledge on the subject of the title, that awakened farmers to the urgent necessity of their possessing it.

The feeds were dissected and the results produced by each when fed to animals were shown. These facts were established by practical demonstration of tested cases that appealed forcibly to the plainest farmers of good hard sense. The methods of feeding furnished their full share in the valuable aid supplied the live stock raisers by this truly serviceable book.

This valuable work has been constantly added to, improved and developed and its general usefulness has so increased its popularity that there has been issued since the first in 1898 up to 1917, seventeen editions. There were eight different printings made of the last edition to fill the demands.

The eighteenth edition of "Feeds & Feeding," the hand book for the student and stockman, celebrates its twenty-fifth anniversary. It surpasses all former editions and we do not know of any book that will approach it in real practical value to the farmer interested inlive stock (which all farmers should be).

This new edition has been prepared by Prof. F. B. Morrison, who for many years has been co-author of the book with Professor Henry. These two specialty geniuses have intensely devoted their energies and talents upon every feature of this subject and have brought forth a wonderful production. They have solved problems, brought to light golden truths and facts in their persistent research, that are of the greatest value to the agriculturists.

This volume not only commemorates their twenty-fifth anniversary, but its completeness, superiority and enlargement to 770 pages, enriched with a large number of attractive farm scenes, landscape views, live stock, horses, dairy herds, feeding cattle, sheep, swine, etc. They have used a corps of trained assistants in procuring the latest discoveries and most important findings of the investigators of both the Old and New Worlds in the science of animal nutrition. They have left undone no effort, regardless of expense, that would add to the perfectness or worth of the book to the farmer. The eighteenth edition of "Feeds & Feeding" should be in every farmer's home, as an indispensable instructor and adviser. It is a monument to the fame of the authors.

The BAYNES' SOIL IMPROVER can furnish this book at the author's price.

SOME IMPORTANT RESULTS
By Late Prof. C. G. Hopkins

It must be agreed from the known facts that thorough tillage hastens the liberation of plant food from the soil, but adds none to it; that the rotation of crops does not enrich the land, but hastens its depletion; and that we cannot maintain the soils of America by means of the farm manure we can produce.

Even if every man fed all of his crops, saved all of the manure produced, and returned it to the land without loss, it could not maintain the fertility of the soil, because as stated in my former letter, livestock products are not made out of nothing. The application of the small amounts of manure produced on the average American farm serves in part to hasten soil depletion. Manure influences crop yields in three distinct ways; first, by furnishing the plant food which it contains; second, by liberating larger amounts of plant food from the soil than would otherwise become available, and, third, by increasing the absorbent and water holding power of the soil, thus furnishing moisture to the crop, which is thereby enabled to make larger growth, enlarge its root system, and to take still larger amounts of plant food from the soil. (The action of rotting manure on the steel tines of a pitchfork left buried in it for six months well illustrates its power to attack mineral matter). The practice of applying 10 tons of manure containing 20 pounds of phosphorus, and then removing 60 pounds of phosphorus in the crops of corn, oats wheat, and clover, is a system which leaves the soil poorer in phosphorus after every recurring rotation.

Methods of fertilizing, involving a better knowledge of soil fertility, the intelligent and abundant use of limestone or phosphate or both, and the growing of special green-manure crops for the sole purpose of plowing under for the benefit of subsequent crops, must be classed as complicated or not "within the reach o the modest means."

Another point of tremendous importance is that one ton of clover plowed under will add as much organic matter to the soil as will be added by all of the manure that can be produced from three tons of clover fed to animals, even though none o the manure is lost or wasted; and we should not forget that, of all farm products, animal excrements are probably the most susceptible to loss About one-half of the value is contained in the liquid excrement and this is almost as difficult to recover as spilled milk. Sufficient absorbent bedding in the older states becomes exceedingly difficult to secure and may even involve greater expense than to grow a crop of clover and plow it under. In other words, there are doubtless conditions under which it is more economical to secure nitrogen directly from the air than to save all of the nitrogen contained in the liquid excrement from animals.

SERIOUS FARM LABOR SHORTAGE MUST BE FACED

There is little doubt, apparently that farmers, the country over, are facing a labor shortage, as bad, if not worse, than any existing in recent years. Building and industrial operations of all kinds, vastly expanded are using the lure of wages, entirely beyond the highest possible farm scale, to attract the labor they must have if their rate of production is to be maintained. Even then the supply is short. In thousands of cases farmers themselves have gone and are going.

But the real farmers of the country must meet the situation. How are they going to do it? The most obvious and logical thing to do is to limit the crop acreage to that which can be nent labor. This may or may not mean reducing the acreage now in efficiently handled with the perma crops but it certainly permits of no extension. More crops for hay and forage can be planted. Soybeans cowpeas and similar crops which need little attention once they are started can be put in. More land can be added to permanent pasturage and possibly more livestock kept. At any rate, it seems safe to say that no more land should be planted than th armer himself can care for, at least until there is a more eauitable balance between the price he receives for his crops and the cost of help.

The other almost equally obvious and logical thing to do is to make sure that every acre in crops produces the utmost. Much of the fitting, planting and fertilizing has been done. If the land has been carefully prepared and the best seed planted, that s good. Conditions call for special attention to fertilization. If heavy applications have been planned, so much the better. Well-prepared, well-planted, well-fertilized and well-protected crops will go far toward makng up any losses which might otherwise follow acreage reduction or poorly handled crops on large acreage.—Soil Imp. Com.

HELPFUL EXPERIENCE

The increased value of manure to which phosphates have been added is attested by most of the experiment stations of the country, for practically all of them have conducted experiments along these lines. The plots at the Missouri station are among the oldest in the United States, and that station's findings are as follows:

"To get the most profit from manure and at the same time most neary maintain a well-balanced condition of soil fertility, it is good practice to reinforce each ton of manure with 25 to 40 pounds of acid phosphate, or 40 to 80 pounds of rock phosphate. When acid phosphate is used it may be applied with the manure or it may be drilled when seeding some small grain crop in the rotation."

PLEASE EXCUSE US

In the July issue of "SOIL IMPROVER," on page 14, we published a two column article on "SOIL EROSION," which in the copy was credited to the Breeders' Gazette, from whose highly appreciated columns we selected it. The printer, in making up the page, dropped the line with "Gazette," which error the proof reader failed to detect. We regret the occurrence and ask for pardon.

FERTILIZER RETURNS BIG PROFIT ON CORN

The Wisconsin Agriculturist contains a very interesting article on results obtained from supplementing farm manure with commercial fertilizer. Waukesha County, Wis., is a great dairy county and the farmers have a large amount of manure available. County Agent felt, however, that it would be profitable to supplement the manure with commercial fertilizer. He had noticed that corn particularly seemed to lack readily available plantfood, especially phosphorus.

The season during which the experiments were tried was dry and unfavorable for fertilizers, but despite this condition very decided differences were noted between fertilized and unfertilized fields.

In fields where about 400 pounds of 2-10-0 fertilizer were applied, there was an increase of 47 bushels per acre over land not fertilized. On one farm an unfertilized row husked out only 67 pounds of corn as compared with 108 pounds from a fertilized row of the same length. And the corn from the fertilized row contained very few nubbins and was riper than that from the unfertilized row. The increase of yield was worth above the cost of fertilizer. The county agent estimates that Waukesha County farmers increased their income $17,500 as the result of so fertilizing 500 acres.

FUTURE OF WHEAT IN AMERICA

One of the outstanding facts facing the American wheat grower is that while population and per capita consumption of wheat in the United States have steadily increased, there has been a gradual decrease in per capita production, according to the United States Department of Agriculture. Wheat is a world commodity and the interplay of economic forces both of national and international character must be carefully considered to forecast the future.

The economic situation of the wheat crop, production and marketing, from seeding to international trade, is presented in the 1921 Yearbook of the Department of Agriculture. This discussion is the result of combined research and study by a number of the nation's leading agronomists and agricultural economists connected with the department. It is illustrated with numerous maps and charts so that it is clear to those without special training in agricultural economics.

Among the significant facts presented it is shown that nearly a third of the farmers in the United States now grow wheat. In some areas more than 80 per cent of farmers are engaged in wheat growing. Only corn and hay exceed this bread crop in acreage occupied, and normally only these two crops and cotton exceed wheat in value. In leading wheat areas whatever affects yields, cost of production or the price, not only affects the welfare of all the farmers who grow the crop, but the whole community. Similarly, the wheat crop as a whole has much to do with the prosperity of the nation, because the grain enters into foreign trade to a greater extent than any other crop except cotton.

This country has exported a surplus in every year of its history since Colonial times with the exception of 1836, besides keeping pace with an ever-increasing demand at home. During the past twenty years, however, the volume of exports has been decreasing, except under the artificial stimulation of the recent war period. Wheat production has been increasing less rapidly than population, and this tendency will probably continue, at least until we reach the point where we consume practically all we produce. Because of improvments in milling processes which make bread more attractive, because of increasing prosperity, and because of the increasing proporition of our population in cities, the per capita consumption of wheat has increased in the United States for the past eighty years.

It is certain that city dwellers eat more wheat per capita than those who live in villages and in the country. There are a number of reasons for this—the lack of gardens in cities, the comparative cheapness of bread, and the fact that no home cooking is required. The fact that the trend of population movement is toward the cities should have a bearing on the future consumption of bread.

How much wheat will we eat if we can get all we want? is asked. Before 1850, the per capita consumption in this country was 3.8 bushels; from 1875 to 1884 it was 4.9 bushels; and from 1895 to 1914 it was 5.6 bushels. The rising trend was interrupted by the World War, but Department authorities believe it has been resumed. How much longer will it continue? In Belgium and France consumption has reached 8 bushels per year per person.

If we are to increase our bread ration to any great extent we must grow more wheat, the Department says. We did grow more during the war, but the increase was partly at the expense of well-balanced rotations and other principles of sound farming. As wheat prices advance, concludes the Department, "production can be increased through the use of more fertilizer and the farming of less productive land. As production and consumption tend to become equal new sources of supply must be sought in order to feed the increasing population.—Western Farm Life.

LIBERATION OF PLANT FOOD

Soils of cut-over or burnt-over timber lands sometimes contain so much partially decayed wood or charcoal as to destroy the value of the nitrogen-carbon ratio for the purpose indicated.

The organic matter furnishes food for bacteria, and as it decays certain decomposition products are formed, including much carbonic acid, some nitrous acid, and various organic acids, and these acting upon the soil have the power to dissolve the essential mineral plant foods, thus furnishing soluble phosphates, nitrates, and other salts of potassium, magnesium, calcium, etc., for the use of the growing crop.

Effect of Tillage

Tillage, or cultivation, also hastens the liberation of plant food by permitting the air to enter the soil. It should be remembered, however, that tillage is wholly destructive, in that it adds nothing whatever to the soil, but always leaves it poorer, so far as plant food is concerned. Tillage should be practiced so far as is necessary to prepare a suitable seed bed for root development and also for the purpose of killing weeds, but more than this is unnecessary and unprofitable; and it is much better actually to enrich the soil by proper applications of limestone, organic matter and other fertilizing materials, and thus promote soil conditions favorable for vigorous plant growth, than to depend upon excessive cultivation to accomplish the same object at the expense of the soil.

PRINCIPLES OF SOIL FERTILITY

(From University Ill. Agr. Exp't. Station Soil Report No. 22)

Probably no agricultural fact is more generally known by farmers and land owners than that soils differ in productive power. Even though plowed alike and at the same time, prepared the same way, planted the same day with the same kind of seed, and cultivated alike, watered by the same rains and warmed by the same sun, nevertheless, the best acre may produce twice as large a crop as the poorest acre on the same farm, if not, indeed, in the same field; and the fact should be repeated and emphasized that with the normal rainfall of Illinois, the productive power of the land depends primarily upon the stock of plant food contained in the soil and upon the rate at which it is liberated, just as the success of the merchant depends primarily upon his stock of goods and the rapidity of sales. In both cases the stock of any commodity must be increased or renewed whenever the supply of such commodity becomes so depleted as to limit the success of the business, whether on the farm or in the store.

Crop Requirements.—Ten different elements of plant food are essential for the growth and formation of every plant. These elements are: Carbon, oxygen, hydrogen, nitrogen phosphorus, sulphur, potassium, magnesium, calcium, and iron; and they are represented by the chemical symbols: C, O, H, N, P, S, K, Mg, Ca, and Fe. Some seasons in central Illinois are sufficiently favorable to allow the production of at least 50 bushels of wheat per acre, 100 bushels of corn, 100 bushels of oats, and 4 tons of clover hay. When such crops are not produced under favorable seasonal conditions, the failure is due to unfavorable soil condition, which may result from poor drainage, poor physical condition, or an actual deficiency of plant food.

Table A shows the plant food requirements of some of our most common field crops with respect to the seven elements furnished by the soil. The figures show the weight in pounds of the various elements contained in a bushel or in a ton, as the case may be. From these data the amount of any element removed from an acre of land by a crop of a given yield can easily be computed.

It needs no argument to show that the continuous removal of such quantities of plant food without provision for their replacement must result sooner or later in soil depletion.

Plant Food Supply.—Of the ten elements of plant food, three (carbon, oxygen, and hydrogen) are secured from air and water, and seven from the soil. Nitrogen, one of these seven elements obtained from the soil by all plants, may also be secured from the air by one class of plants (legumes), in case the amount liberated from the soil is insufficient; but even these plants (which include only the clovers, peas, beans and vetches among our common agricultural plants) are dependent upon the soil for the other six elements (phosphorus, potassium, magnesium, calcium, iron, and sulphur), and they also utilize the nitrogen so far as it becomes soluble and available during their period of growth.

The vast difference with respect to the supply of these essential plant food elements in different soils is well brought out in the data of the Illinois soil survey. For example, it has been found that the nitrogen in the surface, 6⅔ inches, which represents the plowed stratum, varies in amount from 180 pounds per acre to nearly 33,000 pounds. In like manner the phosphorus content varies from 420 pounds to 4,900 pounds, the potassium ranges from 1,530 pounds to about 58,000 pounds. Similar variations are found in all of the other essential plant food elements of the soil.

With these facts in mind it is easy to understand how a deficiency of one of these elements of plant food may become a limiting factor of crop production. When an element becomes so reduced in quantity as to become a limiting factor of production, then we must look for some outside source of supply. Table B is presented for the purpose of furnishing information regarding the quantity of plant food contained in some of the materials most commonly used as sources of plant food supply.

TABLE A.—PLANT FOOD IN WHEAT, CORN, OATS, AND CLOVER

Produce Kind	Amount	Nitrogen	Phosphorus	Sulphur	Potassium	Magnesium	Calcium	Iron
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Wheat, grain......	1 bu.	1.42	.24	.10	.26	.08	.02	.01
Wheat straw......	1 ton	10.00	1.60	2.70	18.00	1.60	3.80	.60
Corn, grain........	1 bu.	1.00	.17	.08	.19	.07	.01	.01
Corn stover.......	1 ton	16.00	2.00	2.42	17.33	3.33	7.00	1.60
Corn cobs.........	1 ton	4.00	....	....	4.00	....	....	....
Oats, grain........	1 bu.	.66	.11	.06	.16	.04	.02	.01
Oat straw.........	1 ton	12.40	2.00	4.14	20.80	2.80	6.00	1.12
Clover seed.......	1 bu.	1.75	.50	....	.75	.25	.13	....
Clover hay........	1 ton	40.00	5.00	3.28	30.00	7.75	29.25	1.00

TABLE B.—PLANT FOOD ELEMENTS IN MANURE, ROUGH FEEDS, AND FERTILIZERS

Material	Pounds of plant food per ton of material		
	Nitrogen	Phosphorus	Potassium
Fresh farm manure	10	2	8
Corn stover..	16	2	17
Oat straw	12	2	21
Wheat straw	10	2	19
Clover hay	40	5	30
Cowpea hay	43	5	33
Alfalfa hay	50	4	24
Sweet clover (water free basis) (1)............	80	8	28
Dried blood	280	...	...
Sodium nitrate	310	...	...
Ammonium sulphate	400	...	...
Raw bone meal	80	180	...
Steamed bone meal	20	250	...
Raw rock phosphate	..	250	...
Acid phosphate	..	125	...
Potassium chloride	..	...	850
Potassium sulphate	..	...	850
Kainit	..	...	200
Wood ashes (2)	..	10	100

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1. Young second year's growth ready to plow under as green manure.
2. Wood ashes also contain about 1,000 lbs. of lime (calcium carbonate) per ton.

THE CROP OF CORN IN U. S.

A professor of Missouri College of Agriculture, gives the following information on corn. The United States produces annually between two and three billion bushels of corn, and according to the best information about 80 per cent of this is fed to livestock while only about 8 per cent is used as human food. These figures would indicate that the farmers producing corn, are dependent on the live stock for a market for their product.

Beech—"Can your wife appreciate a joke?"

Ashe—"Well, she says I am one and I know she doesn't appreciate me."—London Answers.

"Step right up, lad-ies and gent-lemen. Right this way to see the only living woman with two heads in the world," cried the sideshow barker.

"Faker!" sniffed Mrs. Catt. "Why there's a two faced woman living right next door to me!"—Sun Dodger

SWEET CLOVER PROVED GOOD FORAGE CROP

Recently in Pipestone county, Min- esota, I observed a herd of cattle at were carrying an unusual amount flesh for cattle that had had no ed except pasture, while on neigh- oring farms most of the cattle were rather moderate flesh. When the wner of these cattle was asked the ason he led me to a sweet clover asture. "These 25 acres of sweet over are the reason," he said. "These acres of pasture have carried 35 imals throughout the season and never had my livestock in such good ondition at the end of the season. Vith the ordinary native pasture, it rdinarily takes about two acres to arry one animal. I intend to use weet clover pasture almost entirely the future."

The foregoing is typical of the ex- erience of farmers here and there roughout western Minnesota who ave been using sweet clover for asture the last year or two. Occa- onally a farmer says he has had ifficulty in getting his animals to eat at the start, but we have heard of o case where there was any trouble hen the cattle were turned on the weet clover early in the spring before e other grasses had made a good tart.

Sweet clover, contrary to popular elief, requires an abundant supply of me in the soil and should be seeded nly in those localities where alfalfa known to thrive without lime. How- ver, it stands wet feet better than al- alfa. In general, the soils of western Minnesota have an abundance of lime, and farmers in that section who have not tried sweet clover for pasture would do well to try a few acres the coming year. It may be seeded with small grain the same as other clover and grasses. About 18 pounds of unscarified seed should be used per acre while 12 pounds of the scarified is sufficient.

By scarified seed, we mean seed that has been put through some machine for scratching the seed coats. Otherwise usually 20 to 40 per cent of the so-called hard seeds will not germinate the first year. Occasionally there are 60 per cent of these hard seeds. It is important in any case to make a germination test so that one may be sure to use sufficient seed to provide a good stand the first year.

If it is desired to pasture the sweet clover more than one year it is well to keep in mind that sweet clover is a biennial, or two-year plant, the same as red clover. However, we have seen several sweet clover pastures that have given good results for three or four years in succession. In this case unscarified seed was used so that only a part of the plants grew the first year; the rest of them grew the second year and provided pasture for the third year from seeding. It is almost impossible to pasture the sweet clover so closely that it does not seed rather freely, so that if one starts with unscarified seed he has a continuous crop of new plants that will replace those that die out.

An added advantage to sweet clover pasture is that the price of seed is the cheapest of any of the clovers. There are two varieties of biennial sweet clover—the white blossom and yellow blossom. The white blossom is the stronger growing variety and seems to be generally preferred.—W. L. Cavert, agricultural extension division, University of Minnesota.

ALFALFA THE BIG PRODUCER

A Farmer's Great Success After Failure—Valuable Lesson on Fertilizer

There are a great many sections of the country in which alfalfa has not been generally introduced, besides there has been much difficulty in some sections for them to get started right with seeding alfalfa. We give the experience of C. L. Griffith, of Kentucky, who has gone through the experience and reached success in growing alfalfa, after visiting through the northwest and southwest, where he saw the alfalfa fields of his life. It was a beautiful sight and almost looked like a bed of roses to him to see the alfalfa in bloom May 25th, the first crop being in the rick, while the second was being cut and there was no other grass growing there, as it was in the valley of the great American desert. This gave him his first great love for the alfalfa plant.

He also noted the hogs around alfalfa racks eating hay like cows and they were fat.

He had eight years of actual experience in trying to grow alfalfa. The first four years were an entire failure. The next two years, by using double inoculation, did fairly well, but the

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yield was light, and for the last two years, with the liberal use of ground lime stone, he has made a wonderful success, getting four cuttings and making as high as five tons per acre of the most palatable forage plant that grows in the United States today, it is very rich in protein and great as a bone and muscle builder, and when fed with corn, gives a perfect balanced ration. He wintered 80 hogs, varying from 30-lb. pigs to 300-lb brood sows, and their racks are filled with alfalfa hay twice a day, that they clean up. He also feeds about one-third as much corn as he would without hay.

If the soil is sweet, you can grow alfalfa; if not, use ground lime stone. Grind them to a dust and put them back on the land at the rate of two to four tons per acre. This will sweeten the soil to the bacteria or germ that must be present to thrive and feed the plant with nitrogen from the air. Alfalfa, a few months of its life, obtains its whole supply of nitrogen from the air.

It has deep feeding roots, being marvelous soil renovators, reaching into the sub-soil, being nearer the surface the minerals of plant food, where shallow rooted crops can make use of them.

The seed should be planted one-half to one and a half inches deep, and the soil, if sour, must be limed before planting alfalfa. As soon as the nitrogen present in the soil is exhausted, the plant perishes.

Alfalfa is a great lime feeder, there being about 50 pounds of lime taken from the soil for each ton of hay. Lime makes the helpful bacteria thrive. Ground lime rock is the kind to use. It should be ground fine. Never plow under lime or your surface soil will not get the full benefit from it. It is the surface soil that needs the most lime The lime should be put on the soil a few weeks before seeding

To test the soil for acidity, get 5 cents worth of blue litmus paper at the drug store. Take a handful of dirt from the field. It should be moist enough to hold together in balls. Split a ball open with a knife and place a piece of the paper between the parts and press together tightly. Let it remain a half hour, then open. If it turned slightly pink apply three tons per acre. If red, apply four tons per acre.

The lime should be spread evenly, some use shovel, some manure spreader, but the best way is by a lime distributor, made expressly for the purpose. One machine is sufficient for a whole neighborhood. The chances are best with a Spring sowing. Sow early that the alfalfa may get an even start with the weeds. For Fall seeding, sow early in August. If after sowing you get one shower to start the seeds you are safe. In dry weather after started, it roots deep. If there is dampness below the roots, it will reach it. He uses mostly Kansas and North Dakota seed. Use only the best grade and buy them direct from the farmers who grow them. He prefers the Dakota seed as being the hardiest. He advises planting with an up-to-date seeder, such as the American Seeding Machine Co. makes. The seed should be tested before planting for germination. Twenty pounds of seed should be planted to the acre.

Inoculation as applied to alfalfa means artificially supplying the soil with the necessary germs or bacteria. The U. S. Department of Agriculture Farmer's Bulletin No. 278 says: "Nitrogen can be taken from the air and added to the soil by means of legumes, but this takes place only when the roots of the leguminous plants bear bacteria, nodules or tubercles. The amount of nitrogen that any particular legume can add to the soil depends upon the number and size of the tubercles of its roots.

There are two ways to get these germs. First: By soil transfer. That is, to get the dirt from around well inoculated alfalfa plants or a sweet clover patch. The bacteria on their roots are just the same. This should be done in the evening. If the sun is shining hot, it is likely to kill the germs. He does this by loading dirt in lime distributors and following it with a harrow, 200 to 400 lbs. per acre is sufficient.

Second: By pure cultures, which the U. S. Department of Agriculture furnished free of charge, only asking him to report results to the department. Either way is good.

After the alfalfa is one year old, you will get good results from use of the spring-tooth harrow. Immediately after the first and second cuttings it drags the weeds out and loosens the soil, forming a mulch. Never use a rooting harrow, as it cuts and bruises the roots and dirt gets in the wounds, preventing their health, and in time is very injurious to the plant. He believes alfalfa is one of the most profitable crops a farmer can raise.

HOW TO DETERMINE SOIL ACIDITY

The Litmus Paper Test.—This is the simplest and most commonly used test for soil acidity. An easy way to make the test is to take a moist clod of soil, break it open, insert a strip of blue litmus paper and press the soil together. If the paper turns pink or red within about five minutes the soil is acid; if it does not turn pink, the soil is neutral or alkaline. A good grade of litmus paper, 100 strips in a small glass tube, is carried by many druggists. Care should be taken in this test not to let perspiration come in contact with the paper, as this by itself may turn the blue paper pink.—Ind. Agr. Exp't. Station.

SOME TEST RESULTS

The effect of acid phosphate on growing clover in Bedford, Ind. field, unglaciated with manure, limestone and acid phosphate, the yield was 4,000 lbs. of clover per acre. With manure and limestone only, the yield was 1,600 lbs. per acre, being less than half the product with the acid phosphate added.

The effect of limestone on clover on acid soil, Worthington field, Illinois glaciation, with manure and limestone, the yield of clover was 6,460 lbs. per acre and with manure alone, the yield was 3,740 lbs. per acre.—Agr. Exp't. Station, LaFayette, Ind., Cir. 66.

PRECAUTION

No caustic materials, such
quicklime, air-slaked lime, and woo
ashes, should be used on manure, f
their alkaline properties drive th
ammonia out of the manure. Ac
phosphate and land plaster are com
monly sprinkled on the manure
sufficient quantity to form a goo
coating, or they are applied at th
rate of forty to sixty pounds p
ton of manure. In poultry houses
good grade of acid phosphate ma
be kept in boxes before the roos
so that the hens can dust themselv
in it and thus spread it. The pho
phate can be sprinkled over the dro
pings whenever the odor of ammon
is noticed.

If limestone is scattered over m
nure it tends to increase the loss
ammonia into the air, although th
loss is not nearly so serious wit
limestone as it is with quicklime.
mixed with commercial fertilizer
lmestone may cause the reversion
the water soluble phosphoric acid
the fertilizers. While there may
no particular harm in having th
occur, it is usually considered bett
to have the reversion take place
the soil after the acid phosphate h
been applied.

Limestone may be used safely o
the same soil with manure and com
mercial fertilizers. The manure ma
be applied to the soil and plowed u
der, then the limestone spread an
worked into the surface soil.
planting time the fertilizer applic
tion may be made. In this way a
three materials may be used on th
same soil within a short period an
one will not interfere with the ef
ciency of the others.—Money in M
nure.

FARMERS USING BETTER JUDG MENT IN FERTILIZER PURCHASES

Official statistics indicate that far
ers in all sections of the country a
using more discrimination in their s
lection of fertilizers. In constantl
greater numbers, they are abandonin
low-analysis brands for the mo
economical high analyses. To that e
tent they are increasing the purchasin
power of their fertilizer dollars.

Apparently, however, farmers a
just as insistent as ever, upon havin
their own particular grades. Curre
figures reveal that they are still orde
ing a large assortment of unnecessa
mixtures, which manufacturers natu
ally feel called upon to supply.

For exemple, the 1922 Ohio statisti
recently issued, show that while Oh
farmers used about 15,000 tons mo
high-analysis than low analysis, mixe
fertilizers, they spread their purchase
over a hundred different grades
grades varying in many instances b
only a fraction of a per cent of the
plant food content. Of the 310,88
tons used in Ohio in 1922, about 117
600 were mixed fertilizers. Approx
mately 56 per cent of that amount,
some 66,000 tons were high analys
distributed over from 35 to 40 diffe
ent grades. The remainder, a littl
over 51,000 tons were low analys
carried in nearly 70 different grades.

According to Experiment Statio

ficials it is just as wasteful, just as ostly for a dozen different farmers demand a dozen different fertilizers alyses when one would suffice for l, as it would be were all to revert the outlawed low grades. Manufac-rers cannot reduce production costs r if they are compelled to register d manufacture a long list of grades, any of which are practically dupli-ates. The station authorities have udied the needs of the soils and rops of the State and are prepared advise farmers regarding the fer-lizers best suited to them.—Soil Im-rovement Corn.

HE LIME AND FERTILIZER NEEDS OF INDIANA SOILS

From Indiana Agr. Experiment Station Circular No. 66)

The average soil of Indiana does ot produce more than half as much s it is capable of producing. The roduction of greater yields per acre epends upon a number of factors, uch as drainage, rotation, tillage, eed, sanitation and fertilization. Some f these factors depend upon the expenditure of much labor per acre, and view of present labor situation, he farmer should not be charged ith undue negligence on this score. man is not a good farmer, however, f he does not practice methods of anagement and soil treatment that ill increase crops and return a profit. With high prices for farm produce, he farmer can afford to practice a ore intensive system of soil man-gement, and for accomplishing this, othing is more essential than the se of manures, fertilizers and lime. oil fertilization and liming have not een practiced in Indiana long nough, for farmers to feel sure of what their soils need. This publication is an endeavor to tell how to dentify and classify in a general way, he principal types of soil in Indiana, nd to give methods whereby the oils may be tested by farmers, teach-rs, or agricultural agents so that he lime and fertilizer needs may be etermined.

While a few Indiana soils are of ow fertility even in their virgin state, he great majority are low in fer-ility because of long continued crop-ing without adequate fertilization or anuring. The average soil of this tate has been cropped over 50 years, nd is now in such a condition that xtra effort must be made to make t produce big crops. The Soils and rops Department of the Experiment tation has collected samples of virgin nd cropped soils from farms in vari-us sections of Indiana. On each arm, samples were taken from fields hat had been cultivated for a long ime and other samples were taken rom adjacent land that had never een cultivated. Upon chemical nalysis of the soil samples, it was ound that the cultivation had re-uced the supply of organic matter 6 per cent and of nitrogen 28 per ent. The supply of acid soluble hosphoric acid and potash had been educed about 10 per cent and the oil had also become slightly more cid from cultivation. As the main osses, caused by cultivating the soil, were in the nitrogen and organic mat-er, it is logical to assume that in order to restore any fair degree of the virgin fertility, it will be necessary to replenish the nitrogen and humus.

There are two ways for the farmer to increase the nitrogen and humus supply of the farm; one is to purchase it in feeds, fertilizers or manures, and the other is to grow it in crops, especially legumes. It should be remembered that the feeding of livestock and the use of the manure are merely means of conserving rather than of increasing the nitrogen and organic matter supply. Manure accumulated on the farm does not add to the nitrogen supply of the farm, unless the feed fed to the animals had been purchased or secured from legume crops. In fact, in the feeding of live stock, fully one-half of the nitrogen and three-fourths of the organic matter in the feed are lost under good systems of manure conservation. Every thing points to the fact, that it is necessary for the farmer to grow more legumes if he is to increase or even maintain the fertility of the soil.

How to grow the legumes is the next question. Clover is probably our most useful legume and on many of our soils, it is increasingly hard to raise clover. On the average rundown soil in Indiana, limestone and phosphate are necessities, if success is to be had with clover. It may be conservatively said that three-fourths of all the farms in Indiana need limestone and phosphate before a high state of fertility can be reached or maintained. With limestone and phosphate, it is possible to grow big crops of clover, alfalfa and other legumes. If these legumes are fed and the manure conserved and returned to the soil, a good measure of the lost organic matter and nitrogen will be replaced; by pasturing or by plowing under legumes, the soil may be built up still more rapidly.

Chemists have found that while a complete analysis of a soil adds to one's knowledge of any soil, it is not sufficient to determine just what is needed, and in some cases by itself, may be misleading. While chemical analysis does not determine the exact soil needs, there are certain chemical tests that should always be made when diagnosing soil needs. The most essential test is to determine whether or not a soil is acid. By an acid soil, is meant one that does not have a sufficient amount of alkaline material, such as lime, to make it neutral. It has been conclusively established by experiment and by practical experience, in this state and elsewhere, that soil acidity is more or less detrimental to high crop production. Limestone will correct injurious soil acidity and increase crops. Fortunately, a soil acidity test can be made by anyone who may desire to do so.

Clover and other legumes are most suitable for green manuring, because in addition to their abundant humus forming materials they add to the soil large amounts of nitrogen drawn from the air.

Teacher—"Now, remember, Nell, that anything you can see through is transparent. Can you name something that is transparent?"

Nell—"Yes, ma'am; a keyhole."

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The Farmer

Life Sustainer of the People and Nation

He Is Striving for the Protection of His Rights and Securing Equity an Justice—Through Organization

The occupation of the farmer as agriculturist, dates from earliest history of the human race. He is the provider of the raw food for the world's countless millions of people and their domesticated animals.

The farmer is the mightiest necessity in every country for its populations existence. The first dependence of the people is wholly upon the farmer, for the sustaining of life, which takes precedence over all other blessings. This places the farmer's business on the foremost service call, in the line of the population and country's needs.

The sobriquet, "Independent farmer," may have been dedicated to him from the fact that the balance of the human family were relying upon him for their living. But is he, in fact, truly independent or what does his independence consist of? He has the privilege, which he uses, of working longer, more hours than any other class of workmen. His day's labor enroaches upon the night's period, both at the beginning and ending. He is up early and at it late, with less complaint than any other class of laborers.

When he has good crops tho earned by the sweat of his brow, he is joyous. When the rains are withheld and crops are drought stricken, his work is without reward and the people grieve with him over the loss, for all are affected by it.

The forty million hard working farmers have surely been modest through a long period of past years in asserting their rights. They have pursued their course in their quiet manner in the production of the nation's food.

Agriculture is the foundation of the country's wealth and prosperity. There has grown up organized classes of dealers and operators in these farm productions, which they handle between the farmer and the consumer, taking a heavy toll from both, and upon which these operators have grown fabulously rich. This was easily but insiduously accomplished while farmers were dealt with only as individuals. The oppressed condition of the food growers became so serious that the only safety and protection for the farmer was in organizing for defense of their just rights. The farmer's organization has clothed the farmer with a new and greater power and influence. As an organized body, he will be able to demand and secure his just rights, without injury to the equitable rights of others.

Mr. Herbert Hoover, the former food commissioner for the distribution of the world's food during the world war, has had a broad opportunity to give the food question careful study, and his comprehension of the subject is not surpassed by any other person. In a speech, Mr. Hoover had the following to say, "On general industry and food production and distribution:"

"In order to avoid repetition of long phrases, I propose to use the term 'agriculture' as referring to the agricultural industry, and to use the term 'industry' as limited to the production and manufacture of non-food materials.

Make Agriculture Attractive

"The prime problem is to make the agricultural industry economically attractive so that it draws into its service its full proportion of American life so that it can keep pace with industry in its rapid development. When we come to the consideration of practical measures we soon arrive at two primary facts. The first is, the farmer's main production must find its market either in the great industrial centers along the Atlantic seaboard or in export to Europe. In either case, the prices in normal times are made primarily by competition with the other great sources of the world's food supply.

"The second great fact is that the American farmer receives a less proportion of the consumer's purchase price for his product than the farmer of most other civilized countries. The margin between the farmer and the consumer is the widest in the world. This margin comes partly out of the consumer, but predominantly out of the farmer. The line of practical remedy to the farmer lies in decreasing the cost of placing his products in the hands of the consumer. Every cent that we can decrease this cost contributes to the consumer, but even more largely to the farmer.

"Another partial remedy for this situation is advanced many times by our engineers. This is the possible help from improving the waterways from the Great Lakes to the Atlantic seaboard by way of the St. Lawrence, so as to pass full seagoing cargoes. The result would be to place every port on the Great Lakes on the seas. Fifteen states contiguous to the lakes could find an outlet for a portion of their annual surplus quickly and more cheaply to the overseas market.

"Another factor in transportation bearing upon the problem of marketing is the control by food manufacturing and marketing concerns of refrigerator and other special types of cars. The result has been to build up the domination of certain concerns and stifle free competition. Where such formal or informal monopolies grow up, they are public utilities, and if the farmer is to have a free market they must be replaced by constructive public service.

The soil is the source of all our wealth. If it should fail us, silver and gold would be mere dross, and valueless. The farmer is the real miner, for he delves in the earth for the most valuable product which it affords, su tenance for life. He may be said to b the true employer of labor, too, for h sets at work not only man, but man of the animals as well, together wit all the forces of nature.

"But all this is not to be accom lished without much thought and ski and experience. We must make life study of whatever we expect t make a living at. Agriculture is science, and to make a large succes of it means constant and continuo labor and application. All the info mation which the farmer can possib gather as to the questions which mos vitally concern him is invaluable."

FARMERS ARE THE FOUNDER OF CIVILIZATION

The profound and distinguishe statesman, Daniel Webster, say "Let us never forget that the cultiva tion of the earth is the most importa labor of man. Man may be civilize in some degree, without great progres in manufactures and with little com merce with his distant neighbors, bu without the cultivation of the eart he is, in all countries, a savage.

"Until he gives up the chase, an fixes himself in some place, and seek a living from the earth, he is a roaming barbarian.

"When tillage begins, other art follow. The farmers therefore, ar the founders of civilization."

FARMERS SHOULD BE ON GUARD

About every interest in the natio has become organized in their own be half and protection, necessitating th agricultural interests to unite for sel defense and security. In their organ zations, they need to be careful in se lecting their officers, to secure thos who are true, loyal, competent an honest, that their rights and interest may be fearlessly, safely and tru guarded and preserved.

The farmers of today should use a their endeavors to increase the capit stock "yielding power" of their farm

Use the accumulated knowledge the Agricultural Colleges and the Ex periment Stations, which are the us of our active, thinking farmers. Buil up the productiveness of your farm by increasing the crop, then doub and treble, as you apply golden scienc and the valued information of thes great institution teachers.

By the great increase of the fertilit of the soil and the productive pow of the farm, you fortify and strengthe yourself and the country.

The professed farmer, who mere robs the soil by digging out his cro at the expense of the soil, is not e titled to the name of "farmer," as it only a question of time until the far

weakened and exhausted. It was
is class of farming that undermined
id finally destroyed Rome; at one
ne, the ruler of the world.

With high class farming, is accom-
anied the highest class of civilization,
ie greatest invention, grandest im-
rovements in every condition, the
ost profound statesman, an advance-
ent in all classes of knowledge and
arning.

WHEN SHOULD LIMESTONE BE APPLIED?

Assured that most of the soils of
lissouri are strikingly in need of
me, many farmers are asking the
uestion, "At what time of the year
iould limestone be put on the soil?"

Biggest crop increases by limestone
re gained from applying it to clover
nd other legumes, says W. A. Al-
recht, of the University of Missouri
ollege of Agriculture, and for this
eason many recommend using lime in
ie crop rotation just before clover.
'his is a good time, but profitable
eturns from lime are given by corn,
heat and other crops as well, so that
ie crop is not necessarily the decid-
ig factor.

The best recommendation is to
pply limestone at any time when it
an be properly put on the ground
ith least labor and least interference
other field operations. This may
e in the Fall, or it may be in the
pring or Winter. When clover is to
e seeded on Winter wheat in early
pring, it is best to apply the lime in
ie Fall soon after plowing for wheat.
'or the farmer who plows as early as
e should, this will give a long season
hen roads are good, the days long
nd work not so pressing. It leaves
ie subsequent tillage of seed bed
reparation to mix the lime and soil
ithout cost of labor beyond that of
preading. This is the time that seems
onvenient and is preferred by most
ien using limestone.

If limestone is applied before plow-
ig, it should be thoroughly disked
nd mixed into the soil. This extra
ibor has been the main reason for
iaking the application after plowing
referable. Results from field tests
y the University of Missouri College
f Agriculture on the effects of apply-
ng lime on top as compared to turn-
ig it under fail to give any significant
ifferences. But since lime must be
iixed with the soil for speediest and
iost complete action, and since it
eaches downward by rain, the top
ressing is the best practice.

When acid phosphate is used on
heat following liming treatment,
ome time should elapse between the
wo applications. Acid phosphate
iixed directly with limestone changes
rom soluble to insoluble form and
oses much of its immediate value. To
void this loss, the limestone should
e worked into the soil ahead of wheat
eeding, by at least a few weeks.

Limestone may also be applied in
he Winter when the frozen ground
ermits heavy hauling and when there
idle time. It may be put on as
urface dressing for Winter wheat,
r on Fall plowed ground for corn.
t may also be applied in the Spring.
n fact, it may be applied at any sea-
on and for any crop to suit the con-
enience of the farmer. The main thing is to get it on the land. It is especially desirable previous to clover and other legume crops sensitive to sour soils, but its favorable effects last long enough to benefit these even when they are not the first to follow in the crop rotation.

It is well to remember that the biggest effects of lime come not so much from the lime itself, but from its use in conjunction with other soil improvement practices, such as growing legumes, turning under manure and crop residues or using phosphates. Lime increases the soil's supply of available nitrogen by increasing the legume growth to be pastured or fed and returned to the soil. It increases the straws and stovers of other crops that add more organic matter and humus. These, combined with the use of phosphorus or other plant food deficiencies, will increase the soil fertility and materially increase crop yields and profits as well.—College of Agriculture, University of Missouri.

HUGE WASTE OF STRAW

Seventeen million tons of straw are burned every year on American farms just to get it out of the way, according to government estimate, a waste of $28,000,000 worth of nitrogen alone at pre-war prices. These seventeen million tons of straw, says Dr. A. N. Hume, State College Agronomist, contains 187 million pounds of nitrogen, 34 million pounds of phosphorus, and 323 million pounds of potassium. This straw might well be returned to the soil to help maintain the fertility. Further, the South Dakota experiment station has observed that a thin mulch of straw carefully applied to Winter wheat may be the means of helping the crop survive winters that would otherwise be too severe for it.

SOME SOYBEAN SAYINGS

Mr. Samuel M. Jordan of the Missouri State Board of Agriculture has set down the gospel of the soybean as follows, condensed into short sayings:

1.—Soybeans should find a place on every hill farm, and on most bottom farms, and on most flat lands.

2.—Soybeans will not do so well on black bottom lands, unless the land is well drained.

3.—Soybeans give the best relative results in soil improvement on from good to poor soils. Improvement not so noticeable on very fertile lands. Such are not in so much need any way.

4.—Soybeans do not do very well in wet or very sour soil.

5.—Soybeans do not do so well commonly unless given some cultivation. A good harrowing or two often does very well.

6.—Soybeans made into hay, cutting with binder, and shocking in small shocks to cure out like corn fodder make the best of hay, and commonly the yield is large.

7.—Soybeans grown continuously on the same land seem to give better results each year for several years.

8.—Remove soybeans and commonly wheat can be drilled without any further preparation of the seed bed.

9.—Unless your community has made variety tests to find out which sorts are best, it is a good idea to have such done. Varieties act differently in different places.

10.—The Jet, Wilson, or Sable are good hay beans. The bean is black. These sorts are all very hardy.

11.—Be sure to inoculate in all soils that have not grown inoculated soybeans. No other legume will inoculate the soil for them.

12.—Soybeans can be planted from early corn planting time up to the middle of June, and mature. They may be planted as late as July first, and they often make a good hay crop, depending somewhat on soil and moisture.

13.—Soybeans cultivated, is evidently the first best crop to grow on the land ahead of seeding alfalfa.

14.—Soybeans work for both you and your soil.

15.—Get the soybean habit—it will pay!

THE FARMER COUNTS

Dean Davenport says: "After all is said and done, the fact still remains that nothing can take the place of the farmer's individual initiative, industry and enterprise on the farm." This will always stand out prominent, it will be sound 20 years from now.

How and Why of Agricultural Gypsum

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The Gypsum Industries
Dept. 112—844 Rush Street
Chicago, Illinois

RED CLOVER

As an average for the past ten years, Ohio has had practically ten million acres of land under cultivation, of which less than one million has been devoted to clover or other legumes. These statistics indicate that the average rotation in Ohio is nine years of corn, oats, wheat, timothy and other non-legumes to one year of clover, alfalfa, sweet clover, or soybeans. In some sections of the state clover is now grown regularly every third year. Occasionally a man is found who practices the corn, soybean, wheat, clover rotation—a legume every second year. On entirely too many farms there are no fields of any of the legumes to be seen. The state of Ohio will never be able to produce the crops and livestock or livestock products she should, until the present acreage of legumes is at least doubled. As time goes on we can expect to see it trebled. There is plenty of opportunity for increased acreages of all the legumes, not the least of which is the old stand-by—red clover.

Red Clover Not Confined to Limestone Soils.—Having been born and reared in the Miami valley of Ohio, where red clover abounds and is at its best, it is difficult for the writer to believe that any other legume can successfully compete with red clover on the average well-managed farm in western Ohio. But red clover is not confined to this section of the state. The excellent fields of this legume to be seen at the Wayne, Cuyahoga, and Trumbull County Experimental Farms and on numerous other farms in eastern Ohio, under systematic soil treatment, confirm the belief that the successful growing of red clover is easily possible in any section of the state.

Alsike Is a Strong Competitor.—It would be interesting to know just what exact evidence we have in favor of red clover. It must be agreed that the comparative evidence between red clover and other legumes is of a very general nature and rests largley in the unrecorded experiences of many farmers. Each of the legumes has its enthusiasts and rightly so. Conditions differ, soils differ, men differ, and systems of farming differ. Under certain conditions red clover might suffer by comparison. Notable examples of this can be found in many fields on which a mixture of red and alsike clover seed has been sown on soils more favorable to the alsike than to the red clover. The result has been that these fields are covered with alsike, and very little red clover is to be seen. This might be construed as an argument against red clover, but there are many observing farmers who believe that such a happening is conclusive proof that something is wrong with the soil. It must certainly be agreed that alsike clover is better than no clover and some men even prefer it to red clover. But when alsike wins out in the soil in competition with red clover the soil is under suspicion.

Some Favorable Red Clover Evidence.—Twenty-five years ago Director Thorne began his experimental work in soils on the Wooster farm. After some years of careful investigation he came to the conclusion that limestone and phosphorus were absolutely essential for maximum yields on this soil. He decided to demonstrate the results of his experiments in a large way. Accordingly four 10-acre fields were set aside for a rotation of corn, oats, wheat and clover. The fertilization consisted in the application of 10 tons of fresh manure reinforced with 400 pounds of acid phosphate and plowed under for corn, followed by 300 pounds of acid phosphate on the wheat. In unfavorable seasons from 30 to 50 pounds of nitrate of soda were used as a top dressing in the spring on the wheat. Two tons of limestone were harrowed into the soil before planting the corn. As a result of this treatment, the soil, which was originally thin, has been built up until the average yield for the last 12 years has been 78 bushels of corn, 65 bushels of oats, 35 bushels of wheat and 3 tons of clover hay per acre.

The question might be raised, what would the yields have been if soybeans, alfalfa, or sweet clover had replaced the red clover in the rotation? We do not know. But from what statistics show concerning the average yields of corn, oats, and wheat in Ohio, we feel reasonably well satisfied with those secured under this system of management.

High Infant Mortality Among Clover Plants.—The number of seeds in a bushel of clover seed has been carefully estimated. From these estimates it has been found that the usual sowing of 8 pounds per acre is sufficient to supply 50 red clover seeds per square foot of soil. Does anyone believe that 50 plants per square foot are required to produce a satisfactory stand of clover? On the contrary, four or five plants would undoubtedly be sufficient for what would be considered a perfect stand. The chief reason why we sow such large amounts of seed is because experience has shown that oftentimes the stand of clover is thin even with this amount of seed. Undoubtedly part of the difficulty lies in poor seed. But this fails to explain the whole trouble. Evidently in many soils the conditions are so unfavorable for the young clover plants that they are not able to survive. The direct cause of the death of many of them may be the bacterial and fungous diseases which lie in wait for them in the soil. But it is a well-known fact that the more vigorous the plant the better able it is to withstand the attacks of these parasites. The vigor of plants is closely associated with the supply and balance of the available plant food elements in the soil. The ravages of drouth are also much smaller on soils in a high state of productivity.

Seeding Practices Differ. — The method of seeding clover varies considerably. Some farmers make use of special seeding machinery, disk drills or harrows after the ground has dried out sufficiently in the spring to permit of their use. Others practice seeding early enough in the spring to take advantage of the frost as a covering agent. In some cases seeding is deferred until the cracks have opened up in the soil into which some of the seed fall and germinate. Quite a few farmers practice seeding twice, half of the seed being applie during the freezing and thawin period and the remainder later. Som farmers apply from 150 to 200 pound of acid phosphate with a disk dri at the time of seeding.

It is a common practice to sow mixture of red clover, alsike clove and alfalfa at the rate of 5 or pounds of red clover, 1 to 3 pound of alsike clover and from 1 to pounds of alfalfa per acre. In al such cases it is hoped that the alfalf and red clover will comprise th major portion of the crop, while th alsike is sown as insurance agains failure. Fields so sown frequentl show mostly alsike with an occasiona patch of red clover and at infrequen intervals a stalk of alfalfa. Alsik clover is growing in popularity. Th reason is apparent. We wonde whether this is a favorable sign fo the best interests of the agriculture o Ohio.

Why Red Clover Fails.—It is wel to keep in mind that red clover i not a crop which can be used to advantage on poor soils. Red clove will not grow on worn-out soils The soil must be supplied with plent of available plant food for satisfactor crops of clover in just the same wa as for large yields of corn, oats, an wheat. The use of acid phosphate o the wheat is not only for the benefi of the wheat, but is especially necessary for the clover crop following.

Red clover is a plant which ca be used to best advantage in keepin good soils good. As long as thi crop is being grown successfully, th soil is in good condition for th growth of most of the other desirabl farm crops. When red clover fails it is time to remedy the condition which prevent its growth. Acid phosphate and limestone are two ver effective remedies for red clove failures. It is a waste of time an money to throw away red clover see on a poor soil which has not bee supplied with these very essential materials.

Red Clover Needs Encouragement —It is not our purpose to discourag the growing of other legumes. W need and will grow vastly larger acreages of alfalfa, soybeans, and swee clover. There is plenty of space fo all of these. But red clover need our encouragement. It is the onl crop in the ordinary rotation whic has any especial merit as a soil improver. The organisms which liv in the nodules on its roots are constantly at work taking nitrogen fron the air and storing it up for succeeding crops. The manure produced fron feeding red clover has a distinctl higher value for fertilizing purpose than that resulting from the feedin of timothy and weeds, the usual substitute for clover. Red clover i worthy of our best efforts. We wil find red clover coming into its ow as soon as the fertility of the soi has been increased sufficiently to giv it a fair chance.—Firman E. Bea Soils Dep't.

IN THE COUNTRY

What do you hayseeds live on, anyhow?"

"You smart summer tourists."
Louisville Courier-Journal.

merican Farm Bureau Federation News

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

UPHOLD THE FARMERS

The American farmers are the Naion's foundation strength. Remove his support and the whole governent structure would totter and tumle in a wreck.

The American farmers are the proucers of the food sustenance of the eople of the Nation. The product etween the farm and the consumer asses through a number of hands in hich there are added a fee or profit o the price paid the farmer which is ollected off of the consumer. This is ot the Golden Rule as far as the armer producer is concerned.

If the farmer could set his price by dding a small profit to his cost it night be nearer fair, but the buyer ets the price without considering the armers cost.

The American Farm Bureau Federation are making every effort to imrove the market methods of selling he farm products by establishing o-operative commission companies, vhich make quite a saving for the roducers.

The American Farm Bureau Fedration is the source from which the elief must come to the product proucing farmer. Every farmer should vork in harmony with the Farm Bueau.

On their list of speakers are three x-governors and they have a strong orce of competent advisers and offiers.

CHICAGO CO-OPERATION GREAT SUCCESS

andle 11,742 Car Loads of Live Stock During First Year

The Chicago Producers Commission ssociation has voted a refund to its hipper members of 30 per cent of all ommissions paid in during the first ear's business which closed on June 0. The refund amounts to above 70,000.

During its first year of operation the hicago unit of the National Live tock Co-operative handled 11,742 car oads of live stock which sold for a toal of $19,828,033.54.

The Chicago Producers started with manager, two cattle salesmen, three og salesmen, a cashier and small ffice force. This has been expanded th the growth of the business, until he office now has three cattle salesnen, three hog salesmen, and one heep salesman, also a well trained ffice and yard force. When business ustifies a fourth hog alley will be dded and plans are already under vay to employ an additional cattle nan to buy stockers and feeders.

Due to the nature of the co-operaive business, which is largely hogs, he Producers took the lead in the otal number of hogs handled early in uly, 1922, and have held this lead ractically every week since that date, andling at the present time between 2 and 15 per cent of the total receipts of hogs on sale. The cattle business necessarily was slower to develop. Nevertheless this department has made an excellent showing, climbing from twentieth place last fall, up among the six or seven largest cattle firms at the present time. At the start sheep were handled through another firm, but with the growth of this business a sheep department was added the first of May this year.

During the past year the Chicago office purchased 119 carloads of cattle and sheep, representing a saving of close to $1,800 to the live stock feeders. There was no charge made for this service. After the first of July, however, the Board of Directors have voted to make a charge for buying stock. Any profits made by this department will be refunded, as is done with selling commissions.

DURST JOINS FEDERATED

Charles E. Durst, director of the department of fruit and vegetable marketing of the Illinois Agricultural Association for the last two and one-half years, has resigned that position and will devote his full time to the Federated Fruit and Vegetable Growers, Inc. He has been secretary of the national perishable co-operative marketing association since its inception.

Mr. Durst has completed a notable work for the Illinois Farm Bureau. He organized the Illinois Fruit Exchange, with 25 locals, the Egyptian Seed Growers Exchange, the Peoria Produce Growers, Inc., and the Union and Alexander Counties Alfalfa Growers Association.

Mr. Durst is a graduate in agriculture at the University of Illinois, and took his master's degree in 1909. He was retained on the faculty of that institution for nine years, after which he was farm adviser for the Union County Farm Bureau for three years and for the Cook County Farm Bureau for one year. The Federated Fruit and Vegetable Growers, Inc., is to be congratulated on securing the full-time benefits of his training and experience.

WORLD NEEDS 12,000,000 BALES OF AMERICAN COTTON

World consumption of American cotton in the present crop year is expected to total close to 12,500,000 bales compared with 12,293,000 bales in the preceding crop year. A conservative estimate of world requirements of American cotton in the coming year would be at least 12,000,000 bales. In view of the extremely small carryover, a minimum crop of 12,000,000 bales is desirable.

Favorable weather conditions could easily result in a crop of that size in spite of the bad start but there is an equal chance of unfavorable weather, or severe weevil infestation which would cut the crop below its present promise.

Cotton prices have declined from the season's high point but they are above their normal level compared with most other commodities. Crop prospects may change for the better and the outlook for world consumption may become less favorable than it now is, but a decided alteration in conditions would be required to eliminate the statistical strength underlying the market.

NEW CROP FORECAST AT 11,412,000 BALES

The Department of Agriculture estimates the acreage of the 1923 crop in the United States at 38,287,000 acres. This is an increase of 12.6 per cent over 1922 and is the largest ever known.

The condition of the crop as of June 25 was 69.9 compared with 72.4 last year and ten year average of 75.6. With the exception of 1921, the condition report is the poorest for the corresponding date in twenty-two years.

The crop forecast is 11,412,000 bales which compares with 9,761,817 bales last year, 7,953,641 bales two years ago, 13,439,603 bales three years ago and 11,420,763 bales four years ago.

More fertilizer was sold in the cotton states in 1923 than a year ago, and higher prices are an incentive to greater effort in cultivation and in combating the boll weevil. But the south has lost many laborers in the last few months, the crop has a late start and the season in which both weather and weevil are likely to do most damage is still ahead.

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LIME FACTS FOR LIVESTOCK FEEDERS

Is lime necessary in agriculture? If it is, has it not been supplied by the soil in the past and will it not be furnished for some time to come? These are some thoughts suggested by Dr. J. O. Halverson, nutrition specialist for the North Carolina Experiment Station.

"As a background of questions such as these," says Dr. Halverson, "let us look at the limestone regions where farming is practiced and at those regions which contain no limestone or at best contain very little lime in the soil. Such regions are the sandy tracts.

"Lime forms the background of agricultural practice in the sense that it forms the backbone of animals. It is needed by both. Unfortunately for farmers, lime is washed out of the soil by heavy rainfalls. More is also removed by harvesting the grasses and field crops.

"Stockmen living in a limestone region bounded on one side by a sandstone region have long observed the difference in quality of stock. They have recognized the fact that regions abounding in limestone maintain and support good grasses and along with that, good stock. Such a region occurs in Sumter County, Alabama. Dan T. Gray, Director of the Agricultural Experiment Station at Auburn, tells the story in a fascinating manner. The northern part of this country is limestone; the southern half is sandstone. When good stock is wanted, the farmers go to the northern part for it. No one ever goes to the sandstone soil for good stock. Perhaps the reference to lime as the backbone of animals has more of truth than of poetry in it.

"Another such region as told by Mr. Arbuckle, a teacher in chemistry at Davidson College, occurs in Greenbrier County, West Virginia. Here the limestone region is bounded on two sides by sandstone. In this county there is not only a difference in the character of the stock but also in the grasses and in the crops.

"Perhaps the most striking instance of the remarkable effect of lime in agriculture is shown in the Shenandoah Valley, Virginia, where for thirty miles or more down the valley one passes lime kiln after lime kiln. Here are well built-up and well equipped farms. Intensive farming is practiced; good grasses are grown; and last, but not least, good livestock is found in abundance. Good grasses are necessary for good stock.

"In order to imitate nature therefore, and provide conditions resembling the above, we lime our land, our cultivated fields and our pasture grasses. This only partially replaces the depleted stores of lime.

"Our heavy lime feeding plants, the legumes, such as alfalfa and the clovers, need a good supply of lime. It is well known that these legumes do not thrive on lime-poor soils."—B. W. Kilgore, Director, F. H. Jeter, Editor.

The phosphoric acid content of ground bone or bone meal should not be overlooked. From 25 to 30 per cent is the common proportion with considerable nitrogen.

THE ONLY ROAD TO PROSPERITY

Clover and Crop Rotation Are Building Better Farms

More than ninety-four hundred persons were enthusiastic witnesses at the twenty demonstrations of the Clover and Prosperity Campaign recently completed by the Missouri College of Agriculture in ten eastern Missouri counties. Each of these meetings was held at the home of some farmer who has been cooperating with the College and following its recommendations with reference to the use of lime, fertilizers and inoculation in securing good stands of clover and other legumes. Consequently a notable feature of each meeting was a field of legumes showing the actual results of these practices.

MANY APPLE TREES NEED PLANT FOOD

Apple trees on thin upland or other poor soil are likely to need fertilizing. For such orchards, F. H. Ballou, associate horticulturist, Ohio Experiment Station, recommends the application of a mixture of equal parts of nitrate of soda or sulphate of ammonia and acid phosphate.

He would apply these fertilizers very early in the spring, just as the buds begin to swell. For a poorly nourished twenty-year-old apple tree, about ten pounds of the mixture is suggested. This is scattered evenly in a circle beneath and a little beyond the branches, but keeping a few feet away from the base of the tree.

For trees from five to ten years of age applications of from three to five pounds are recommended.

Fruit trees covered with a rich dark green foliage and large twig growth probably need very little nitrogenous plant food.—Soil Imp. Com.

$900,000 IN CLUB PRIZES

G. L. Noble, Secretary of the National Committee on Boys and Girls Club Work, reports that $900,000 is being offered in prize money to encourage boys and girls club work this year in the United States. Fourteen states have reported a total of more than $263,000, or an average of $18,800 per state. In one state the amount is $75,000. The response from breed associations, expositions, business men and others shows a substantial increase over last year when $734,000 was awarded.

EAT MORE MEAT

Although the United States has only one-sixteenth of the world's population, yet our country has one-sixth of the world's live stock cattle, one-half of the mules, one-third of the hogs, one-fifth of the horses, and one-ninth of the sheep.

As consumers of meat per capita, the United States stands fourth among the countries of the world, consuming 142 pounds per person per year. Those leading us are Argentina (281), Australia (263), and New Zealand (213). Canada eats 137 pounds and the United Kingdom 120 pounds.

WORTH CONSIDERING

In buying your fertilizers, dea with reliable dealers that will trea you fair and justly with what yo really need.

Buy high analysis brands of fertilizer, as it is recommended th safest, cheapest and best. You ca use your own dirt for fillers, cheape than you can buy it, if you want lo grade.

Don't overlook having a plentifu supply of legumes growing at al times through the growing season Have different varieties, as som may prove better than others durin some seasons.

The farmer who is striving fo the largest crop yields, is like th banker who seeks the highest interest bearing bonds that are safe. Th large yields decreases the cost o the production.

Silage is a great saving of feed fo live stock; it is about like having rich pasturage throughout the year

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The farmers should rally to th support of the American Farm Bnreau Federation in the various count organizations, for their own benefit

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Farmers who have not subscribe for "BAYNES' SOIL IMPROVER should subscribe at once; it will b an investment that will pay 100 pe cent at least. Have your neighbo join you and thus treat your neighbor as yourself to a good thing.

THE FOUNDATION OF FARMING

The soil is the foundation of th farm. Everything on the farm come from the soil or depends upon it.

A successful farm cannot be built upon a poorly prepared soil foundation any more than a good farm building can be built upon stones hastily selected and carelessly pu together.

The worth of the building is determined before a stick or stone appears above the ground and likewise the future of the crop is either made or marred before the seed is eve planted. No amount of labor afterward can make up for lack o thorough foundation work.

This is no new discovery. It ha been a part of human knowledge fo centuries. Yet how easy it is to pu the knowledge behind us when face with the back-breaking task of finishing a difficult seed-bed.

Any man who has dragged back and forth across a field dozens o times in the broiling sun knows wha a temptation it is to stop when th job is in just fair shape and deceiv himself that the crop will someho overcome the handicap of clods, ai spaces and lack of moisture.

There is nothing to be saved an everything to be lost in this half-wa preparation of seed-beds. On th other hand, it is possible to save a least half the time by use of the righ tools and methods.

SANDY SOIL SUCCESS IS THEME OF BULLETIN

Proper methods of cultivation will ıke it profitable to farm all but the orest of the sandy soils of Wiscon- ı. The right crops, proper fertili- tion and management are essential, clare A. R. Whitson and H. W. lsperger, in a new bulletin, "Suc- ed with Sandy Soils," issued the Wisconsin College of Agri- lture. One-fifth of Wisconsin's res, or 6,000,000 acres, is classed as ndy loam, fine sand and sand.

"To improve sandy soils, acidity ıst be corrected, humus added to ld the soil together and help hold e moisture, blowing stopped, and e right fertilizers added," they in- ;t. "Liming is often the first step, ıce it makes it possible to grow ops of legumes which fail where e soil is acid. Legumes and ma- ıre make sandy soils capable of oducing more.

To Improve Sandy Soils

1. Add lime.
2. Stop blowing of land.
3. Apply proper fertilizers, to supply elements lacking in the soil. Clover, alfalfa, and other legumes, either plowed under for green manure or fed to dairy cattle and the manure returned to the soil, will add nitrogen and humus. The addition of phosphate and potash in some of their more available forms as fertilizers is frequently necessary.

By plowing in the spring, by plant- g windbrakes, by growing cover ops and by using a corrugated ller, sandy soils may be protected d improved. A firm seed bed to- ther with thorough cultivation to nserve moisture and kill the weeds ıkes profitable crops possible.

Rotations for sandy soils should ovide crops which build up the fer- ity of the soil. Among the best sh crops are soy bean and clover ed. Potatoes can be grown when good degre of fertility has been at- ined. Hay, legumes and corn sup- rt live stock. The nurse crop is eded to protect the sandy soil in e winter and spring. Rye makes a lendid nurse crop on sand. Al- lfa is one of the best crops for ndy soil and will succeed when operly sown and fertilized. The tation of corn, rye and clover is e best general rotation for sandy ils in a fair condition of fertility. y beans and rye can be grown in tation on the poorer sand sails d can be used in the process of ilding up fertility.

FILL 'EM UP

The heavy movement of grain starts is week.

The Department of Transportation the American Farm Bureau Federa- n asks all shippers to see that all ain cars are loaded as heavy as pos- le in order to preserve the present pply of cars. The loading of an tra five or ten thousand pounds in car will mean the saving of many usands of cars. Shippers should their utmost to help carriers avoid other shortage such as existed last l and winter.

LIBERATION OF PLANT FOOD

The chemical analysis of the soil gives the invoice of fertility actually present in the soil strata sampled and analyzed, but the rate of liberation is governed by many factors, some of which may be controlled by the farmer, while others are largely beyond his control. Chief among the controllable factors which influence the liberation of plant food are limestone and decaying organic matter. Tillage also has considerable effect in this connection.

Effect of Limestone

Limestone corrects the acidity of the soil and thus encourages the development, not only of the nitrogen-gathering bacteria which live in the nodules on the roots of clover, cowpeas, and other legumes, but also the nitrifying bacteria which have power to transform the insoluble and unavailable organic nitrogen into soluble and available nitrate nitrogen. At the same time, the products of this decomposition have power to dissolve the minerals contained in the soil, such as potassium and magnesium, and also to dissolve the insoluble phosphate and limestone which may be applied in low-priced forms. Thus, in the conversion of sufficient organic nitrogen into nitrate nitrogen for a 100-bushel crop of corn, the nitrous acid formed is alone sufficient to convert seven times as much insoluble tricalcium phosphate into soluble monocalcium phosphate as would be required to supply the phosphorus for the same crop.

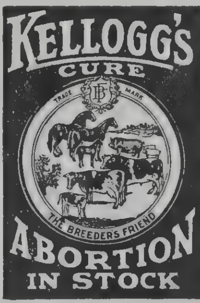
Effect of Organic Matter

Organic matter may be supplied by animal manures, consisting of the excreta of animals and usually accompanied by more or less stable litter, and by plant manures, including green manure crops and cover crops plowed under and also crop residues such as stalks, straw, and chaff. The rate of decay of organic matter depends largely upon its age, condition, and origin, and it may be hastened by tillage. The chemical analysis shows correctly the total organic carbon, which constitutes, as a rule, but little more than half the organic matter; so that 20,000 pounds of organic carbon in the plowed soil of an acre corresponds to nearly 20 tons of organic matter. But this organic matter consists largely of the old organic residues that have accumulated during the past centuries because they were resistant to decay, and 2 tons of clover or cowpeas plowed under may have greater power to liberate plant food than the 20 tons of old, inactive organic matter. The history of the individual farm or field must be depended upon for information concerning recent additions of active organic matter, whether in application of farm manure, in legume crops or in sods of old pastures.

The condition of the organic matter of the soil is indicated more or less definitely by the ratio of carbon to nitrogen. As an average, the fresh organic matter incorporated with soils about twenty times as much carbon as the nitrogen, but the carbohydrates ferment and decompose much more rapidly than the nitrogenous matter; and the old resistant organic residues, such as are found in normal subsoils, commonly contain only five or six times as much carbon as nitrogen. Soils of normal physical composition, such as loam, clay loam, silt loam and fine sandy loam, when in good productive condition, contain about twelve to fourteen times as much carbon as nitrogen in the surface soil; while in old, worn soils that are greatly in need of fresh, active organic manures, the ratio is narrower, sometimes falling below ten of carbon to one of nitrogen. Except in newly made alluvial soils, the ratio is usually narrower in the sub-surface and subsoil than in the surface stratum.

The most satisfactory and economical method of fertilization is by the use of manures [illegible] animals maintained on the farm [illegible] what the farm produces.

A Guaranteed Treatment
For Abortion and Failure to Breed



Purebred stock of all kinds—particularly hogs and cattle—are very susceptible to the disease commonly called Contagious Abortion, which may result in either Abortion or Failure to Breed. This disease can be permanently cured and thousands of prominent breeders testify to the success of the Kellogg Treatment. It is a guaranteed remedy for hogs and cows and is fed either in bran or salt, requiring no other attention. Excellent for all stock, keeping them in a healthy breeding condition. State number of animals and their general breeding condition when writing for our free booklet and price list.

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FACTS CONCERNING THE MANUFACTURE OF FERTILIZERS

In his paper on "The Fertilizer Business as a Chemical Industry," F. S. Lodge, Armour Fertilizer Works, Chicago, presented the following interesting facts concerning the manufacture of fertilizers.

The fertilizer business is the largest group of the heavy-chemical industries.

More than 90 per cent by weight of the ingredients which enter into the composition of the fertilizers consumed in South Carolina—the largest fertilizer-consuming state—are strictly chemicals.

It requires approximately 6¾ million tons of chemicals to supply the annual demand for fertilizer in the United States—the other 10 per cent, or 750,000 tons, consisting mostly of cottonseed meal, packing-house tankage, fish scrap, blood meal and lesser tonnages of garbage tankage, processed leather, and other waste products.

Organic ammoniates, such as garbage, scrap leather, feathers, hair and felt are processed either by digestion with acid or by long-pressure cooking in order to convert the complex nitrogen compounds into forms readily available for plant use.

Phosphate rock, from a tonnage point of view, is the most important raw fertilizer material. About 2¼ million tons of phosphate rock were consumed in producing the 7½ million tons of fertilizer consumed in the United States in 1914.

It takes approximately 1,100 pounds of phosphate rock and 1,100 pounds of sulfuric acid to produce a finished ton of acid phosphate.

To produce 1,100 pounds of sulfuric acid, 233 pounds of sulfur and 7 pounds of nitrate of soda are necessary—the sulfur being obtained from Louisiana and Texas, and the nitrate of soda from Chili.

This country produces more sulfate of ammonia than it consumes. In 1920, 367,000 tons were produced. We have exported practically 100,000 tons per year for the last two years.

Cyanamid is made in this country only at Niagara Falls.

Ammonium nitrate is the original chemical produced at Muscle Shoals. Owing to its nitrogen concentration and its physical condition, it is not a very satisfactory fertilizer.

About 25 to 30 per cent of the average cost of fertilizer to the farmer represents freight—including freight on raw materials, supplies and on the finished goods.

A fireproof, modern, complete fertilizer plant having a capacity of 60,000 tons of fertilizer represents an investment of about one million dollars.

Practically all fertilizer must be shipped from the factory within a period of three months—eight weeks in the spring and four in the fall.

The fertilizer industry has invested in the United States about 300 million dollars in its effort to supply the agriculture of this country and of the world with the best fertilizer.

Unleached hardwood ashes will supply potash to the soil and frequently contain as high as 8 per cent of potash in the form of carbonate.

SOUTH DAKOTA PRACTICE

We give you what our experience in Faulk county, South Dakota, as practical.

Four and five year rotations are recommended for this county. Corn followed by wheat followed by oats or barley with sweet clover sown at the same time as the oats or barley is a good four year rotation. A five year rotation that is working reasonably well with us is corn, winter wheat or rye followed by corn followed by oats with which is sown sweet clover.

There is no simple satisfactory test an ordinary farmer can make to show the proper fertilizer need of his land that I know of. There is a test that every farmer can make which, while not absolutely accurate, will give him a very good general idea of what his land needs. The test which I speak of is that of planting several small plots making the addition of manure alone to one plot, of manure and rock phosphate or acid phosphate to another plot, of manure and complete fertilizer to another plot and of a complete fertilizer alone. Many variations of this test plot system can be used, any of which will give some very good ideas and suggestions to the farm operator.—Chas. J. Gilbert, Agr. Agt., Faulkton, S. Dak.

A BIG MISTAKE

There are very few farmers who I ever talked with who are not willing to acknowledge, although they might in most instances be considered by their neighbors as being highly successful, that they have made mistakes.

Some were free to admit that some of their mistakes were quite serious. The trouble generally had proven as danger signals, thus preventing the duplicating of the error; in this manner they had proved a service and a schooling for them.

I will make one exception. I talked to one man who asserted that he never made a mistake, that there was no necessity for it if you knew your business. I found out in a very short time that it was a mistake on my part to prolong the conversation with a man of this character. In fact, he was not able to detect his own mistakes and had so overestimated his abilities that he could not realize nor would not admit a mistake pointed out to him. This party's greatest mistake was in misjudging his own qualification.

The majority of men engaged in any business are anxious to have mistakes made known to them to enable them to avoid them.

ALFALFA EQUALS BRAN

Alfalfa is the cheapest source of protein. When wheat bran is worth $22.00 per ton good alfalfa hay is worth on the average $20.00 to $22.00 per ton, because alfalfa is equal to wheat bran (pound for pound) in feeding value, so says Dr. Perry G. Holden, who speaks from practical experience as a farm manager and educator.

RULING ON FARM SPELLING

The Missouri State Board of Agriculture today announced a ruling on the spelling or form of writing five words, each of which has been giving writers and proofreaders a lot of grief Four of the words have been used as two words, but are now to be written as one word without hyphen The most troublesome and most used word is stated first and should be written as a single word without hyphen as "livestock."

The same single word rule without hyphen applies henceforth to "purebred," "butterfat" and "broomcorn."

The word meaning to use a threshing machine in handling grain is no longer "thrash," but it should hereafter and henceforth be "thresh."

This ruling of the Missouri State Board, through Secretary Jewell Mayes, is in conformity with a late decision made by the "Committee on Terminology" of the United States Department of Agriculture.

By observation any reader will speedily see the "mixed pickles" of the usage of these five words at the present time, the "unscrambling" of which has come none too soon.

TO FATTEN A CARLOAD?

It is a good question, "How much feed does it take to fatten a carload of cattle, a carload of hogs, a carload of sheep?"

The Missouri State Board of Agriculture submits the following figures based on investigations by the United States Department of Agriculture:

Six hundred bushels of corn and 17 tons of hay will fatten 250 lambs weighing 55 pounds each and make them weigh 80 pounds. This will make one double-deck carload.

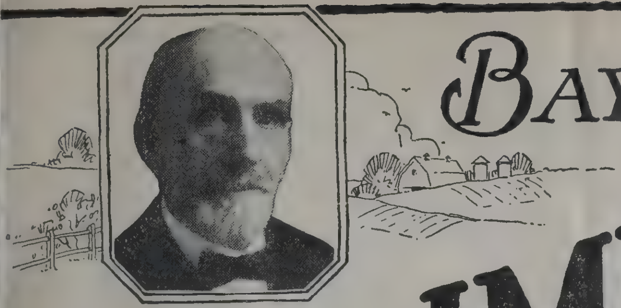
Four hundred and fifty bushels of corn and 2,750 pounds of tankage or fish meal will fatten 70 hogs averaging 100 pounds, to 200 pounds, making one carload.

One thousand one hundred bushels of corn, 10 tons of alfalfa hay, and 5 tons of straw will fatten 20 steers averaging 850 pounds, making them gain 325 pounds each in 180 days This is an average carload.

RECIPE FOR PRODUCTION ECONOMY

Dr. F. E. Bear, Professor of Soils Ohio State University, says, "The reduction in expenditures in fertilizers limestone and other soil-improving agencies, with the continued cultivation of the same number of acres usually means an increased cost per bushel of grain produced. ......If, instead of cutting the acre application of fertilizer in two, the acreage were reduced and a higher rate of application made over the cropped acreage than before, the total production could be maintained at an actual reduction in cost per bushel........

"Judging by the experimental tests at Wooster, the acre yields of Ohio crops could be doubled simply by doing systematically over long periods of time the things that are now generally recognized as essential in good soil management."



BAYNES' SOIL IMPROVER MAGAZINE

UNIVERSITY OF ... JAN 9

EDITED BY JAS. BAYNES, 38 YEARS EDITOR OF THE AMERICAN SWINEHERD

Vol. 1 SEPTEMBER 1, 1923 No. 3

FAITH IN THE SOIL

"Write the vision, and make it plain upon tables, that he may run that readeth it."

Every person young or old, rich or poor, is dependent upon the soil for his existence and every blessing which follows with it.

The home of the Soil is the Farm, it is through the farm it blesses the farmer directly and mankind indirectly.

The farmers who are the occupiers of the soil must, to achieve success, have an enduring faith in the soil to respond to methods of farming which the highest schools of agriculture have established as correct.

Scientific investigation of the soil and the natural laws governing it, showing the necessity of properly feeding the soil to enable it to retain its productive strength has not been generally practiced.

To produce maximum yield of crops, the soil must be supplied with certain known elements.

For a full understanding of the proper feeding and methods of treatment of the soil for common practical use of farmers we are entering a new cycle for which all progressive farmers should qualify.

Published monthly by JAS. BAYNES & CO., *Webster Bldg., Chicago, Ill.*

SUBSCRIPTION 25 CENTS A YEAR

TABLE OF CONTENTS

Page

Inspire Love for Farm.
Biggest Dollar.
The Farmer's Lament...... 2

The Soil.
Primary Lesson No. 1..... 3

Primary Lesson No. 2..... 4

Editorial.
Don't Nurse Trouble.
Purebred Seed.
Diversified Farming.
Large Yields Cheapen Costs. 5

A Suggestion.
Select Your Seed Corn.
What One Has Done........ 6

Found the Low Price.
The Farm's Salvation.
Feed the Soil............... 7

Page

How Corn Breeds.
Developing the National Fertilizer Practice.
The Farm Home Charms.... 8

Pointed Lime Points.
Phosphorus Feeds Clover.
Agriculture at the Top...... 9

The Why of Clover Failure.
Seed Corn Experiences.
Sludge Fertilizers 10

More About Nitrogen.
Oat Varieties to Suit Soil.
Best Fed People............ 11

Intelligent Use of Fertilizer.
Worth of a Ton of Manure.. 12

U. S. Advantages for Abundant Production.
Alfalfa and Clover........... 13

Page

The County Agent.
Fertilization Practice Successful
Co-operative .Farmers' Strength 14

Sweet Clover in Missouri.... 15

How the Plant Uses Its Food.
Norbeck-Nelson Bill 17

Have You a Silo?.......... 18

Analysis Figures.
Fertilized Pastures.
Don't Leave the Farm....... 19

American Farm Bureau News. 20

Minimum Hog Production.
Prospects Brighter for Grain Growers.
Capper-Tincher Act 22

INSPIRE LOVE FOR THE FARM

The boys on the farm should have the germ propagated that will be the ruling passion and chief aim of their life. There is an earnest longing for this at an earlier age than is generally supposed.

The boy is quite small when he first shows an eagerness to call something on the farm his. It may be a pig, calf, lamb or colt that he takes a pride in claiming as belonging to him.

This is a feature which should be cultivated, as it will be strengthening the tender loving chords, which will attach him more firmly to the farm. He should early be given something or some share of it, in which he will have some responsibility in its care, that will inspire him to look after it, for the sake of the result in its sale, when he should receive his portion, which will prove it no dream, but a reality.

This generates the ambition and strengthens the esteem and ability of the boy, that will enable his thoughts, awaken his enterprise, increase his energies with mutual benefit to himself, his mother, father and home.

In this manner he will grow into manhood with a feeling of independence and self-respect, with an ardent love for his parents, brothers, sisters and home, that cannot be shaken, as his heart will be established there. He will be of noble manhood that will place him in the front rank of the progressive, successful, influential farmers.

BIGGEST DOLLAR

One dollar invested in a five-year subscription in "BAYNES' SOIL IMPROVER," which will entitle you to a premium of the 74-page booklet, "Feeding Dairy Cows," by G. H. Humphrey and F. B. Morrison, the highest authority on feeds in the United States or Europe. This book is a schooling itself, specialized on the dairy feeding. One party said the information in it was worth ten dollars to him.

It answers hundreds of questions on all kinds of feed, and on the feeding of cows in all conditions. Feeds that are wasteful, etc.

You will get double value for your dollar. Pin a dollar bill to your letter with your name and postoffice address plainly written and you will be made glad twice that we hitched these two up-to-date servants together; they make a team that is bound to get there.

A LANDMARK

R. V. Webber, La Plata, Mo., in sending in subscription for "BAYNE'S SOIL IMPROVER" states: "When I received the sample copy of your newspaper I thought the name implied enough for a monumental inscription to the grave of any man, and it is a landmark that is greater by far than an image of wood or stone. With hopes of every farmer becoming a soil improver I am subscribing."

A FARMER'S LAMENT

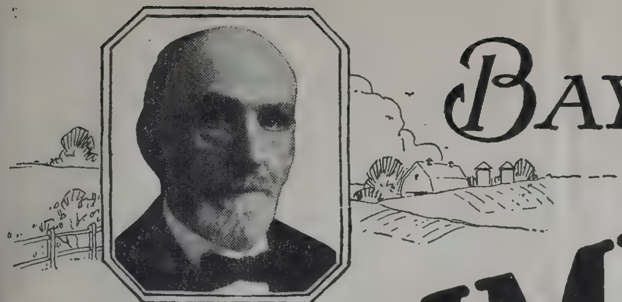
There are many farmers who h
made it known that they did not fu
comprehend the scientific instruct
sent out relative to soil fertilizi
There were complications and te
nical chemical names which are und
stood by those who have had the be
fit of a schooling on this line, wh
most common farmers have not
ceived. This prevents them from h
ing a clear understanding of the
formation.

We are introducing in our Septe
ber issue of "BAYNES' SOIL I
PROVER" a schooling consisting
ten lessons used by one of the st
colleges of agriculture for their jun
club classes. We start with the
mary lessons No. 1 and 2 in Septe
ber issue and publish two of the
sons a month for five months.

These will give our readers a
months' schooling on this line. Th
should be read carefully and stud
until acquired.

This will benefit those of our re
ers needing it and is an easy school
without loss of time. Cheap way
become an expert. If you love y
neighbors as yourself, have them j
you in this school. The quarter lo
small, but it pays for twelve mont
subscription, and takes in the ten
sons.

From which experience of others
we profit most, their successes or f
ures? It would seem that we wo
profit most from that which cau
the others the greatest sacrifice.



BAYNES' SOIL IMPROVER MAGAZINE

/ol. 1 September 1, 1923 No. 3

HE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

he Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

PRIMARY LESSON 1

Plant Foods and Their Sources

1. If you own a pig, and want it to row into a big hog, you expect to ed it every day. Plants, also, need ood for their growth. When a grain f corn is put into the ground and prouts and grows and finally makes big stalk with an ear of many hun- red grains, you know that this stalk d ear were not made from nothing. ut did you ever stop to think what ind of food the corn plant and other ants live and grow on, where this od comes from, and how much of it e plant uses? In these lessons we e going to study these things. We ant to know these things, because nowing them should help us to grow igger and better crops.

2. Plants need ten plant foods for eir growth. If any one of these is anting very little or no growth can made. The names of these ten ant foods are: Carbon, oxygen, ydrogen, nitrogen, phosphorus, po- ssium, calcium, magnesium, sulphur d iron.

3. These plant foods no doubt seem ry strange. Really it is only the ames that are strange. The plant ods, themselves, make up the larger rt of many of our most common bstances. For instance, the air is most one-fifth oxygen and four-fifths trogen. Water is about one-eighth ydrogen and seven-eighths oxygen weight. Coal contains much car- n. Our common rocks all contain ore or less of the other six plant ods.

4. One reason why the names of ese plant foods seem strange is be- use we are using the term foods re for plants in a way a little differ- t from the way we would use the rm in speaking of foods for people. read is a common food for people, t bread is made from a number of different things, such as flour, milk, etc. If we knew how, we could further separate the flour and milk, etc., which make the bread into a number of simpler things, and so on, until finally we would get to things so simple that they could be no further divided.

5. Chemists have found that the earth and everything on it are made up of about eighty of these very simple things, just put together in different ways. These very simple things are called elements. The ten plant foods are elements.

6. Elements usually are not found singly or uncombined, but nearly always joined together with one or more other elements. Sulphur and iron are the only two of the plant food elements that are commonly known in the uncombined state; the others usually are combined among themselves or with still other elements. Plants always take up their plant foods in some combined form and change it so as to use the elements they need.

7. Plants get their carbon and oxygen from the carbon dioxide gas of the air. This gas is thown off from the lungs of animals in breathing. It is also formed when coal, wood and other vegetable materials are burned or when they decay. It forms a very small part of the air, but there is enough to supply all that plants will ever need. Hydrogen is obtained from the water which is taken up from the soil. Carbon, oxygen and hydrogen make up the larger part of plants, or more than nine-tenths.

8. Before we can understand where plants get their nitrogen, we will have to notice something about the nature of our land. We think of land or soil as made up of two different kinds of matter. These two are mineral matter and organic matter. A very long time ago, the surface of our fields was not as it is now, but the solid rock came entirely up to the top. In many natural ways this solid was broken down first into small rocks, then into coarse sand particles and finally into the very fine particles we find in the soil now. From the very first of this breaking-down process, plants and later animals began to live and die on the land and their remains to become mixed with the broken-down rock. Thus was our soil formed—the mineral part being the remains of the old rocks, and the organic part being the remains of decayed plants and animals.

9. There was no nitrogen in the original rocks. All the nitrogen now in the soil has been added from the gaseous nitrogen of the air and is found only in the soil organic matter. This nitrogen from the air has been added to the soil mainly through the growth of certain plants, which, under certain conditions, have the peculiar power of using the nitrogen of the air. These plants leave this nitrogen combined in solid form in their tissues, and when they are added to the soil, other plants can use it. The plants which have this power of using the air nitrogen are the legume plants, such as the clovers, alfalfa, cowpeas, soy beans, etc. All other plants, corn, oats, timothy, etc., must use the nitrogen in the soil, which has been placed there largely through the growth of legume plants. Without the growth of legume plants, farming, as we have it now, could not be carried on.

10. The six other plant foods, phosphorus, potassium, calcium, magnesium, sulphur and iron must be taken from the soil by all plants. These six plant foods were present in the original rocks, and on their breaking down, remained behind in the soil.

QUESTIONS FOR STUDY*

How do plants grow? 1. Name the ten plant foods. 2. Where do plants get their oxygen and carbon? 7. Where does the hydrogen come from? 7. What two kinds of matter make up soils? 8. In which part of soils is the soil nitrogen found? 9. How did the the nitrogen get there? 9. What plants are able to use the air nitrogen? 9. Where must other plants get their nitrogen? 9. Where do plants get their phosphorus, potassium, calcium, magnesium, sulphur and iron? 10. How did these six plant foods get into the soils? 10.

---

*Numbers refer to the paragraphs in which the answers will be found.

LESSON 2

The Need for Feeding Crops. Plant Foods Likely to Be Low in Soils

1. From what has been said, it might seem that plants or crops would feed themselves without any help from the farmer. It perhaps seems as if all the farmer has to do is to plow the ground, plant the seed, keep down the weeds, and the crop will take care of itself. But this is not entirely true, for, as you know, one field may grow big crops, while another nearby may grow very small crops.

2. We call a soil that will grow big crops a rich or fertile soil, and one that will grow only small crops a poor or infertile soil. There are a number of things which have to do with making soils fertile or infertile. The drainage of the soil is important. A flat field that is wet much of the time will not grow good crops. Such fields are very often tile drained to remove the water, and may then produce good crops. The physical condition of a soil is important. By physical condition we mean the way the soil works; whether it plows well or not; whether it tends to be loose and mellow or, on the other hand, hard and compact. The power a soil has, like a sponge, of holding much of the rainfall so that crops do not suffer for moisture during the dry spells, is also important. But one of the most important things having to do with the fertility of soils is the amount of plant food they contain, and most often the reason why one field produces better crops than another nearby, is because the one contains more plant food than the other.

3. For a soil to be poor does not necessarily mean that it is poor or low in all the plant foods; it may be poor in only one. If a soil contains enough of all the plant foods except phosphorus to grow a big crop and contains only enough phosphorus to grow a small crop, then a small crop is all that can be grown. If you were to build a dam across a small stream to make a pond, very likely it would be higher in some places than in others, but the lowest place in the dam would determine the height of water in the pond. In much the same way the plant food supplied in lowest amount determines the size of crop that can be grown. Most soils are low in only one or two, or at the most three plant foods. The plant foods which are low in soils and which hold down crop yields are known as the limiting plant foods.

4. Some of the ten plant foods are much more likely to be limiting plant foods than others. Oxygen and carbon come from the air and hence can never be limiting plant foods. Hydrogen comes from the water and is plentiful so long as there is plenty of water. All the other plant foods must be obtained from the soil by all crops (except the legume crops, which can use the air nitrogen under proper conditions). Iron, however, is used by crops in such small amounts and is present in all soils in such large amounts as never to be a limiting plant food. Likewise magnesium, sulphur and calcium are probably present in large enough amounts in most soils not to be limiting plant foods.

5. Nitrogen, phosphorus and potassium are the three usually thought to be the common limiting plant foods. Nitrogen and phosphorus are in truth limiting plant foods in very many soils, being present in such small amounts as to make impossible the growth of large crops. Potassium should not be considered a common limiting plant food. In most soils the supply is sufficient for large crops if conditions are made favorable for its use.

6. Hardly any of the soils of Kentucky are actually low in potassium. Some of the soils of the state, however, as we will notice later, are farmed so poorly that crops are not able to get from the soil all they need.

7. The soils of the well-known Bluegrass region of Kentucky, and many of the bottom land soils, contain plenty of phosphorus. The other soils of the state are low in phosphorus. All the soils of the state are low in nitrogen. The best soils of the Bluegrass and the best bottom land soils contain the most nitrogen. Most of the other soils of the state are very low in nitrogen.

8. Practically all the nitrogen in soils is found in the soil organic matter. This means that the soils which are low in nitrogen are also low in organic matter. We will later learn that organic matter in soil does a number of other useful things besides supplying nitrogen.

9. Crops get most of their plant food from the plowed layer of soils. This is one reason why it pays to plow six to eight inches deep rather than four. An acre of soil to a depth of six to eight inches weighs around two million pounds. In this acre surface two million pounds of soil, the soils of the Bluegrass region of Kentucky contain from two to nine thousand pounds of phosphorus; the best bottom land soils, from 1,500 to 2,000 pounds; and the rest of the soils of the state only about 700 to 1,000 pounds. Nearly all the soils of the state contain 25,000 pounds or more of potassium in this acre surface two million pounds.

10. The amount of phosphorus and also of potassium in soils decreases slowly through the sale of crops and livestock from the farm, and the soil tends in this way to become poorer in these plant foods the longer it is farmed; but for the most part the amount of phosphorus and potassium present in soils today is determined by the amount present when the soils were cleared. Also the amount of phosphorus and potassium in soils is about the same in all the farms of the same community.

11. The amount of nitrogen in soils, on the other hand, differs very much from farm to farm, sometimes even between different fields on the same farms. The amount of nitrogen in soils depends much more on the kind of farming that has been done there in the past than does the amount of phosphorus and potassium. On some farms, cultivated and grain crops have been grown much of the time and most of the crops grown have been taken entirely from the land; or in other words, no farm manure or vegetable material, such as corn stalks wheat straw, clover and cowpea crop has been put back on the land. Th soil on such a farm grows poor i nitrogen very fast. Usually the mai reason why one farm produces muc poorer crops than another one nearb is because the poor farm has bee farmed so that most of its organi matter and nitrogen have been los Many of the soils of Kentucky contai no more than two thousand pounds o nitrogen in the surface two millio pounds of an acre.

QUESTIONS FOR STUDY

Give some reasons why one fiel will produce larger crops than an other. 2. What is meant by a limitin plant food? 3. Name the three mos common limiting plant foods. 5. Ar any of the soils of Kentucky low i potassium? 6. In what parts of Ken tucky are the soils low in phosphorus 7. In nitrogen? 7. How does farmin tend to make lands poorer? 10 and 1 What plant food in soils is most in fluenced by the kind of farming tha has been done? 11.

THE DOUBLE TEAM, SOIL AN SEED

The farmer who raises winter whea should select proper seed and a goo yielder and thus give the soil a goo chance with its manuring and othe fertilizing feed to balance the ratio to prepare it to produce from 35 to bushels of wheat.

Where the soil is analyzed so tha its condition is known and then su plied with just what would put it best condition with the proper moi ture to give the maximum yield it wi get your approval.

MAKING A SPECIALTY

Prof. Henry says: "That no ma can reach success as a teacher or i vestigator until he narrows his subje to one line." If you want success, y can learn how others have reached and made fortunes for themselve You get the benefit of their exper ence, without the risk or cost that the went through. This is an opportuni to procure valuable information a instruction. teaches you a successf business at an insignificant cost.

It is readily conceded that no o man knows all the good things nece sary to make a success, except he h gathered it from the collected wisdo of many. Those who believe the know it all are usually those wh know the least and are generally fai ures.

The progressive farmer is alwa anxious to learn all that he can to e able him to keep at the front of h business. The business farmer finds necessary to obtain all the informatio possible to enable him to compe with his progressive neighbor. T most satisfactory plan of acquiri correct knowledge necessary to rea success is from practical experience those who have made their business success.

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EDITORIALS

ON'T NURSE TROUBLE; OVERCOME WITH COURAGE

The great body of farmers of the
nited States have been tested in
e past, many times, with arduous and
fficult troubles, in which their in-
rests were hazarded and have proved
ual to the occasion. They are not
a class weaklings, but have the
lor to firmly meet the matter and
lve it fairly and fearlessly. The
raggling exceptions are ciphers in
ont of the dot and therefore deduct
othing from the the body of farmers.

The reduced price of wheat caused
the world surplus, while it is re-
etted by all, is being thoroughly in-
stigated by the American Farm Bu-
au Federation. After getting all the
cts they will determine the right
urse to pursue to secure the best
sults for the farmers having wheat
market.

We appear to be on the eve of
volving another cycle in farming ad-
ancement, which the present condi-
on has demonstrated the need of.

The power and service of the Ameri-
an Farm Bureau in acting in behalf
f the farmers as a whole in treating
e various subjects for the best in-
rests of all, is proven the correct,
asonable and forceful business way
act.

This forward advance step in agri-
ulture is the universal opinion of
rmers of the necessity to protect the
rtility of their soil, by feeding it in
e various ways proven successful by
xperience. This progressive act will
levate agriculture to a higher plane.
t will be an act of justice to the soil.
lso avoid specializing on a single
rain crop.

The farmer element consists of loy-
l, law-abiding people who have al-
ays responded to the call of the gov-
rnment with a promptness exceeded
y none. They acknowledge the equal
ights and privileges of all other citi-
ens of the United States, and do not
sk for anything that they would not
e willing to grant to others. They
rganize, not to harm or injure others,
ut to defend their own interests as
roducers and prevent the consumers
cing at the mercy of profiteers.

The farmers of the United States are the solid pillars that safely and securely uphold the nation. They are the producers of the sustenance of human life, and the source of the essentials necessary for almost every other industry in the country. These products of the soil of the United States are larger than those of any other country on the globe. They not only supply the wants of our own people, but in addition will fulfill the shortage of several other countries.

The farmers of the United States have a right to be proud of their vocation and their citizenship.

PURE BRED SEED

The value of pure bred seed for grain and plants is as fully established as it is with pure bred livestock. Like produces like is nature's law. By selecting the choicest of the pure bred seed, and feeding the producing soil, the favored feed required, will not only maintain the quality and purity, but establish an improved strain or family by intelligently pursuing it.

It is claimed that one reason for weeds becoming so hardy and such vigorous growers, contesting and crowding cultivated plants, was because of the continued war against weeds, those that through hardiness had survived produced a robust race trait.

DIVERSIFIED FARMING SAFEST AND BEST

The famer who diversifies the productions on his farm with multi-crops, and a general line of varied live stock and fowls, has realized this season the practical advantages over the one crop specialist. Especially is this the case where the one crop farmer has placed his entire dependence upon a wheat crop.

One of the strange features of the market was that in June and July wheat was selling at times as low as 96½ cents for 60 lbs. and corn at the same time was 89½ cents for 56 lbs. The corn is principally fed on the farm and therefore the soil has the benefit of the retained fertilizer, while wheat sold from the farm causes a loss of the fertility that was required to produce it.

The price of hogs has held up well under the largely increased number received at the markets this season. Beef cattle, sheep and lambs have brought a fair price during most of the time. There was no complaint on wool or cotton.

The weak point has been on marketing the farm produce. There has been too many handlers, each of whom had a commission between the producer and consumer.

The Farm Bureau Federation is working out a system of co-operative marketing to overcome this unreasonable commission charge. The low price of wheat has been the principal reason for the complaint of the farmers who make a specialty of this crop, while all farmers who have wheat to sell will be cut some in their receipts, while some of their other products will make up for it. The diversified farmer has something to sell all through the year.

It is fortnuate that the farmers specializing in almost exclusive wheat raising for their market crop are limited to but a few states. There is good reason to believe these will largely change their one crop system before another year.

The figures show how the over production lowers the price of the whole crop. The estimate of the crop produced by the United States growers for the year is 821,000,000 bushels of wheat, while the United States consumes 550,000,000 bushels and besides seed and feed leaves for export 272,000,000 bushels. If there had only been raised what was consumed it would have sold at $1.50 per bushel which would have amounted to more money than if the whole crop of that consumed and also exported had sold for a dollar a bushel. "Don't put all the eggs in one basket" is a good precept to follow.

LARGE YIELDS CHEAPENS COST

The desirability of increasing the fertility of the soil is so apparent that all will agree with the proposition

One of the urgent needs of farmers today is to lower the crop production cost. This can be done by increasing the yield, and is accomplished most readily through fertilizing the soil.

Every farmer is awake to the fact of the necessity of keeping up the soil's fertility. To do this the best methods of feeding the soil must be followed for greatest success.

The feeding of the soil may be done in a wasteful and costly manner where the farmer has not adopted the best proven modes, as shown by scientific tests.

It has been shown that with wheat three-fourths of the whole cost would be the same for yield of 24 bushels per acre as it would be for 16 bushels and for corn would be same for yield of 60 bushels per acre as for 40 bushels. Through the fertility of the soil is the principal means of increasing the yields and therefore of diminishing the cost of crop production.

The farmer who studies carefully his crop yields in a business way, will turn his attention to the necessity of enlarging the yields per acre of his crops. The farmer who can maintain the productive strength of his soil and at the same time increase his yields is like a bank paying dividends and increasing its surplus at same time.

It has been shown by experiment station trials that the judicious use of homemade manure and other fertilizers have paid for all the expense and then a greater profit besides than for the yield where no fertilizer was used.

The "BAYNES' SOIL IMPROVER" will be found helpful to all its readers in increasing their success in farming. It only costs you a quarter to become a partner.

LEGUMES FURNISH BOUNTY

Don't forget this is the legume age, it is popular because it is profitable.

The legumes are headed with alfalfa as the king and followed with strong members of the great legume family, red clover, soy beans, cowpeas, sweet clover and others.

One or two at least of the legume plants should be grown on every farm. Farmers growing them have a preference, having been successful they continue growing it.

The legumes are an industrious plant and besides furnishing the farmer pasturage or hay feed, they at the same time give the farmer a bounty in nitrogen to fertilize the soil. The cheapest soil feed to be had.

Some farmers have made a success of planting in the corn field with the last or next to last cultivation, soy beans or cowpeas. Then when the corn is matured they hog it down, and the beans or peas provide a variety in feed upon which the hogs make splendid gains.

It saves labor in gathering and husking corn. The hogs make greater gains than when fed ear corn in a pen, the exercise of hogs in doing the double work is a matter of economy that helps these times of high cost of labor. And the further benefit of fertilizing the soil by feeding and leaving the excrement and corn stalks on it.

A SUGGESTION

The hardest question to calmly discuss
Is our two hundred million wheat surplus.
The new-made statesman says we must beat it,
And then invites all the world to eat it.
This year's price drop was worst ever in wheat,
Must stepped on the toes of so many feet.
It has caused such a loud uproarious yell
From everybody who had wheat to sell.
The smiling one and his good reason why,
His farming plan was to diversify.
Why not join with the smiling farmers' ranks?
And smiling with success give him our thanks.

ENFORCED MIXED FARMING

The farmer who expects to succeed finds it necessary to do sound thinking as well as good plowing, to be able to manage properly and satisfactorily obstacles that confront and embarrass him at times.

The drop in the price of wheat has caused apparently as much alarm and excitement as if it was the first time this had ever occurred. It is a common yearly occurrence. There is seldom a year passes without the price of wheat making a drop. There was a decline last year, but the price later on recovered. The condition financially of the European markets that usually contract and buy our wheat ahead for future use, are buying sparingly this season.

The wheat specialist farmer has felt the price drop as if it were a broadside fired into his ranks and compels him to consider his condition and position for future safety.

There could not be a stronger demonstration of the fallacy of the one-crop system, than by comparing it at this time with the mixed farming methods.

At a meeting of the dairy farmers last month of Wisconsin, the leading dairy state, Emanuel Phillip, former governor of the state, said in addressing the farmers: "Seriously, in Wisconsin we do not hear the cry of failure, because wheat crops have failed or prices are low. We never have absolute crop failures. Our dairymen always have monthly checks to pay their bills."

Wisconsin farmers, less than fifty years ago, were driven from wheat raising specialists because of exhaustion of the soil, to dairying and mixed farming, and have recovered the fertility of the farm and grown prosperous. The farmer with corn, wheat, oats, soy beans, alfalfa, clover, etc., with cows, hogs, sheep and a bunch of young steers for market would have a much better outlook at this time.

SELECT YOUR SEED CORN FOR NEXT YEAR'S CROP PAYS

The prudent farmer who takes pride in raising a good crop of corn, both in yield and quality, should always select his corn while on the stalk for his next season's seed. Pick ears of standard size of a uniform type from good, strong stalks. Take the best and most perfect ear from stalks with two ears on.

The yellow corn varieties' standard are Reed's Yellow Dent, Leaming & Charles Yellow, are 10 to 10½ inches in length and 7 to 7½ inches in circumference.

The white corn varieties' standard are Boon County White, St. Charles White, Johnson County White, are 10½ inches to 10¾ inches in length and 7½ to 7¾ inches in circumference.

While yours may not be of these varieties it will give you an idea that may help you in doing your selecting.

The corn should be fully matured, lack of ripeness indicates poor germination, which might give trouble when planted. Care should be taken that the ears were free from disease.

The grain of the ear should be in regular rows of uniform appearance, the irregular grains at the butts and tips of the ears not to run far.

These are some of the desirable points which every one may not be able to get perfect, but will find it profitable work which will show in his next year's crop.

The ears must be properly cared for when pulled. Many of the farmers leave a little of the husk on to hang it on a pole sheltered until it gets perfectly dried out without any danger of becoming mouldy.

POINTS IN EXPERIENCE IN HOGGING CORN

Never turn the hogs in until the corn had started to dent. The corn does not reach its full feeding value until it reaches this stage of growth. Get them in just as soon as possible after the corn dents, because evey day they hog off, lessens the work.

There should only be a small area hogged at a time, as there is less danger of loss, especially if the fall is rainy. Use low wire fencing for a temporary fence. An anchor post is set at each end and a few stakes driven into the ground at wide intervals. When this area is fairly well cleaned up, turn them into a new area. Keep them on full feed.

Plenty of water must be provided. If the field is at a distance from the regular water supply an automatic waterer is used. A hog on full fe needs an abundance of water to ma economical gains. It is a mistake make the hogs go a long way for v ter. With this corn and soy beans hogs gained an average of 2½ pour a day for 28 days.

WHAT ONE HAS DONE A OTHER MAY DO

In various sections of the count there have been old run down a worn out farms, and on account poor condition bought at a low pr by some enterprising persons who h faith that they could by a proper sy tem of farming restore the fertility.

Some of these wrecked farms overworking and underfeeding a grandly located for choice locality reside in and conveniently near markets. At times one is found w the buildings on it, worth really mo than the price asked for the enfeebl farm.

The soil that does not pay by yield for the seed and work done up it is not valued very highly. Farmi is disheartening to the laborers on farm of this character.

The "BAYNES' SOIL IMPRO ER" will furnish its subscribers t treatment for these sick and weak s farms, to restore them to health a strength to produce crops that a profitable and highly encouraging.

This has been done by young m whose means were small and by usi legumes and lime and conserving st ble manure in the start and gradua fed a balanced ration to the soil, a used sound reason mixed with th work, earned splendid farms a homes.

INTENSE FARMING NEEDED T INSURE REMUNERATION

To make the advanced prices no ruling for farm lands with the war i flation figures skimmed off, a safe r munerative investment will require e larged returns.

Therefore to insure profitable cro on the new basis of values, it will r quire larger yields of crops, a bett class of livestock, and more thorou methods of handling same, either f the grain, dairy or meat markets.

To do this requires intense farmin increasing the yields per acre or pr ducing two blades or more of gra where one grew before and double t bushels of grain upon the acre th has previously been grown and other crops in same proportion co pared with what was produced on t previous basis.

This as a general proposition w likely decrease the size of the farm and put as much work on half t farm as was formerly given to t whole farm, use more fertilizers, o tain a full knowledge of just what t soil needs most, to increase its cap city for yielding larger crops; bett cultivation, more and greater intere given in the larger yields than was fo merly the case and consequently be ter profits.

This will require more thoroug farming, both in preparing the soil f the seed and in its cultivation ther after and the use of better qualities pure seed and taking better metho in saving same.

The enhanced value of the farm will make it necessary to use the most progressive and improved methods of producing and preserving the food for the stock. It will increase the number of silos for saving the silage, as it enables the farmer to carry a larger number of livestock and almost double the capacity and profits of the dairy, through the virtually canning process of the silo with summer food.

It will awaken new ambitions in the desire of the farmers to generally adopt the use of pure bred stock to the advantage and benefit of the breed and of the farmer. It will result in a forward, progressive advance in agriculture and trained drilled agriculturists.

FOUND THE LOW PRICE AND FARMERS NEED IT

Every farmer is deeply interested in the yield of his farm crops, which depends upon the soil of the farm. A large per cent of the farmers of every country have given less study upon the soil and its requirements to enable it to produce its best efforts than any other farm problem.

The "BAYNES SOIL IMPROVER" is the first and only paper making a specialty of treatment of the soil, the real heart of the farm, by scientific feeding as nature's laws require to prevent exhaustion and largely increase the yields. The subscription price is only 25 cents a year, although it offers to benefit the farmer in the way of increasing crops of hundreds of dollars.

At request to familiarize some farmers with the scientific terms in chemistry in reference to the soil we will publish lessons used by an agricultural college with its junior club classes.

We will commence in September issue with primary lessons 1 and 2 and continue two lessons a month for five months. This will be a cheap schooling for our subscribers. Farmers, here is a splendid opportunity to rally to join the ranks of our readers. You only risk a quarter of a dollar. Let us hear from all who desire to improve their farm.

LIVE STOCK, THE FARM'S SALVATION

The farmer who is engaged in raising grain and selling it off the farm is practicing a deceptive kind of farming. He may believe that he is doing a profitable business in merely digging out of the soil so many bushels of grain and selling so many dollars' worth each year.

This class of farming is misleading; it is virtually selling the soil, or the valuable part of it, which produces the grain, but if it is not replaced it is lessening his power to produce another crop.

There is a limit to the productive capacity of every farm; some are greater than others, but grain growing for the purpose of selling the grain through the elevator or warehouse, shipping it off of the farm, is about the same as digging ore out of a mine and declaring dividends—it must end. Its fertility is gone, unless it is replaced. The farmer engaged in this method of farming is looking down at his feet; he is extracting the kernel, and the future generations, his children who will own the farm, will have a worthless piece of property in the shell unless a change is made.

The best plans of maintaining the fertility of the soil and improving it, is through live stock, hogs, cattle, horses and sheep, and rotation of crops. By this plan you are feeding back to the soil the ingredients that are essential in producing the grain; and by raising certain crops of legumes, which absorb nitrogen from the air and store it in the soil through the plants and roots, thereby adding to its productive power, increasing the yields and restoring with interest the fertility. This plan of farming is wise, looking to the future, and providing a farm that will become richer each year in the power to produce grain and plant growth.

One trouble in this country was the ease with which land was obtained from the government, and being of such extent that the mass of the farmers only regarded the present. In the old countries they have been compelled to protect the fertility of the soil and in some counties where they have been for over 1,000 years farming, their soil is growing richer and more productive through wise methods of farming by restoring the fertility the crop drew from it, with the ingredients that are needed for the growth of the plant and grain. Here manure and other fertilizing elements with rotation of crops are regarded as a savings bank of the farm.

KNOW YOUR SOIL

Get the complete
beginners' course of
10 lessons starting

THIS ISSUE

Read announcement
on 3rd cover and
act at once

KNOW YOUR SOIL

*"Make two blades grow
where one now grows"*

Farmers are sometimes tempted to sell the grain because it is high, but it is a poor policy. That which is equired for human food, such as wheat and oatmeal, should be offset by purchase of bran, shorts, etc., to feed back to the farm, and bone meal from the packing houses should be used to produce the grain.

We call to mind a section of farming lands where sixty-three years ago, having been worn out, as then termed, were raising ten bushels of wheat to the acre on an average, which now produces from fifteen to forty-two bushels to the acre. But no crop is sown without applying bone dust, which is not only pofitable for the crop raised, but to the grass that follows it. Where hogs are fed the corn on the farm, and the dairy is made one of the departments of the farm, or through live stock feeding the productiveness of the farm is not only maintained, but increased.

Every farmer who is looking to the future, as it is only wisdom to do so, will feed on the farm all the coarse grain and all the plant growth so as to maintain and improve the fertility and productive capacity of the farm, thereby increasing its productiveness and adding to its value.

FEED THE SOIL

We have been talking about feeding the hogs and pigs for the best advantage for growth, development and profit. Perhaps a little talk on feeding the soil will not be out of place, especially when parties are changing their system of farming from the one crop idea by diversifying in crops and adding thereto live stock. There is no better or cheaper method of feeding the soil than feeding the growth from the soil to live stock.

The Wisconsin Experiment Station says: "There are several ways in which the producing power of soils may be increased; namely, by adding organic matter and lime, by increasing the supply of plant food elements, by improving the water supply and filth. This is not a fixed improvement formula for every kind of soil, but it points out the way. A long cropped, clay loam or a silt loam soil, usually requires attention in every particular. It is lighter colored than it was twenty years ago. The humus has been largely used up. It works harder and bakes easier. Caused by the lack of humus, or organic matter. If the soil is acid and refuses to grow good red clover, it does not contain enough lime. If the crop dries up during a short dry period, the water supply is at fault. If the crop is short and the yield is low, when other conditions are favorable, starvation is the cause. The soil has not sufficient available nitrogen, phosphorus and potassium. Start in with hogs, feeding the crop that will draw the nitrogen from the air and the hogs will convert the humus from the product, and thus feed the hungry soil with what is needed."

SILO SAVINGS BANK

The introduction and adoption of the silos by the American farmer was one of great importance and value to him.

The silo established an era of pronounced farm advancement. It provided a feed that comes nearest to meeting the quality and cheapness of a luxuriant pasturage. It enlarges the capacity of the farm to care and provide feed for a larger number of livestock.

The prudent and earnest Secretary Mayes of Missouri Board of Agriculture gives the following advice:

"The silo enables the farmer to keep double the number of livestock on his acreage. Silage is the best and the cheapest roughage. It can be fed with profit to all kinds of young growing stock, and is valuable as a summer feed where pastures are short.

The silo makes for economy. The silage crop is harvested when the weather is good and the farmer not so busy. More roughage can be stored in less space and kept in the dry with less labor than otherwise. The silo is looked upon by progressive dairy farmers as a necessary part of farm equipment.

"The silo is a watchtower of agricultural prosperity, and no farming program can afford to ignore the silo and silage. Missouri's twin opportunities for farming advancement along special lines are found in dairying and poultry. Without the silo dairying is so much more difficult, than the silo and silage.

"Is it not time to take counsel on the relation of the silo in economic agriculture when the marginal relation between the cost price and the selling figure is the chief topic of country life discussion?

"Start a silo and sigh not!"

HOW THE CORN BREEDS

The corn blossom is rather an odd one, being on two parts of the corn plant. The tassel contains the pollen, and there is a thread of silk for each grain that would be possible for an ear of corn. The thread of silk is attached to what we call the ovule on the cob. It is, in a sense, a hollow tube, and when a grain or cell of pollen from the tassel enters the end of the thread of silk a growth begins that passes down the thread of silk to the ovule, making it possible for the grain to begin to form.

If we should tie a sack over the end of the ear so that no pollen could fall upon the silk, not a gain would form on the ear.—Secretary Mayes, Bulletin, Mo. Bd. Agr.

DEVELOPING A RATIONAL FERTILIZER PRACTICE

Crops generally remove from the soil more potash than phosphoric acid. Fertilizers usually contain more phosphoric acid than potash. The necessity of this seemingly illogical practice is very well brought out in an article written by Prof. Frank D. Gardner, of the Pennsylvania Experiment Station.

"The experimental data shows that nitrogen alone, potash alone, and a combination of nitrogen and potash have practically no effect on the growth of crops on this soil, while phosphoric acid has a marked effect although it does not in itself fully maintain the fertility of the soil. This evidence is sufficient as a basis for the statement that phosphoric acid is the limiting factor of crop production on this soil. After this limiting factor has been erased by the addition of sufficient phosphoric acid, then something else may become a limiting factor and that something else appears to be potash. Consequently, in their conclusions, the authors (of bulletin 146, Pennsylvania Experiment Station) have recommended that phosphoric acid and potash make up the main portion of the fertilizer applied. They provide for the utilization of the barnyard manure on the farm which, by all means, should be supplemented with phosphoric acid and they suggest that the commercial fertilizer containing a small amount of nitrogen as a starter be used on the wheat. * *

"Soils generally are well supplied with potash and are deficient in phosphoric acid. The phosphoric acid supply is seldom sufficient to last more than a century while the potash supply is so large that it becomes chiefly a problem of so managing the soil that it can be made available as needed by the crops grown. Furthermore, phosphoric acid is lost from the farm in products sold more rapidly than potash since a larger proportion of potash is found in the straw of plants. A rational fertilizer practice should be based on the needs of the crops grown and the plantfood supply in the soil and should take into account the system of farming and the amount of plantfood possible to return in farm manures."

SOUND TALK

A prominent official of the American Farm Bureau Federation depicting conditions, in his speech we find the following truths that are to the point:

The responsibilities of leadership are reflected in its propaganda literature. It was not hard to persuade farmers to join; all that was necessary was a negative appeal—a depiction of their existing plight. Once in, it devolves upon the leaders to dissipate roseate hopes of the millennium, to develop morale and discipline, to inculcate patience.

Such sentences as the following may be found in association literature: "The careless or indifferent farmer will not prosper under any marketing system"; "No system of selling can abolish the law of supply and demand and keep up prices indefinitely in face of overproduction."

THE FARM HOME CHARMS

There are some radical changes occurring continually in the habits, customs and general tendencies of the people, as the clock of time unrolls its annual history.

There are indications that we are entering upon a new era for the advancement, betterment and the protection of the farmer's interest and just rights. They have adopted cooperation as a means of self-defense, which they are driven to by the imposition of the so-called middle man, the acting parties between the producer and consumer.

This acting in unison, gives it strength and power to protect the rights and interests of the farmers. The independent farmer is therefore being reinstated in genuine independence and will be able to reap his rightful reward from his labors.

The farmer's importance is recognized as the master of the farm, the real foundation of the prosperity and greatness of the country. The Government acknowledges the necessity of the success of the farmer, in producing the heavy crops of grain, fruits, vegetables and food products.

The Agricultural Colleges and Experiment Stations, the pride of each of the states, are aiding the farmer's interest and the agricultural industry, with the knowledge of the most progressive leaned professors in their various specialities. They are advancing and improving in the yields, developments and protection of crops from damage of every character of pest, rust, etc., etc. They are thus elevating and promoting farming to a stable and fixed science, beneficial to the individual farmer and the country.

The work, inspiration and influence of these colleges, joined with the practical aid of the stations, is instructing, preparing and fitting a class of farmers of the highest qualifications and approved royal ambitions.

These farmers will infuse animate and surround the agricultural interests with charms that will make country life more alluring than in the city. The farmer will wear a wreath of honor and be recognized as the prominent citizen of the nation, the solid basis of the country's dependence, life, glory and prosperity. Therefore, let every farmer commence preparing for the change by adding something towards the charm of his home continually.

REDUCING HOG SURPLUS

We must all admit that the price of pork hogs has stood up well against the increased number marketed. The tendency favoring younger and light porkers is increasing the consumption of this class of sweet meat. They are on a par with spring chicken frys. We believe it will continue to increase.

It is a safe plan to cull closer on al breeding stock, it not only keeps the surplus down, but it improves the quality of the future herd. Mark every unprolific or otherwise inferior sow for the market.

The farmer can aid in augmenting the eating desire of our people by having the choice condition from good feeding, pigs weighing 185 to 250 pounds butchers' pigs; and light bacon pigs 160 to 190 pounds. These two classes sell at the top prices, a premium of over a cent a pound over heavy packers. This light class of porkers are relished by the consumers.

DANISH FARMERS LEAD

The farmers of Denmark have th reputation of enjoying prosperity which has caused investigation by public officials of the United States and the press to discover their methods o reaching success.

London has claimed for years tha the quality of the Danish bacon wa superior to that from all other countries and commanded a higher price This appears to be one of the mode of establishing and increasing a market for their goods, by its supreme excellence, which is its own recommendation. The enormous amount o the yearly gains of the quantity exported and marketed shows the valu of having high quality product.

The same remarkable steady increase in the quantity of butter an eggs exported was shown. The cow are tested and those failing to reac the standards as butter producers ar not retained in the herd. The chickens are tested for best layers. Thes tests are made of breeds of horse cows, hogs and fowls and in securin the best has reduced the cost of production of their product.

The distributing of agricultur products is by co-operating in marke ing, which cuts down the cost of th producer in reaching the consumer.

Ninety per cent of the farms ar owned by the farmers living on thei and operating them. The averag sized farm in Denmark contains onl irty-five acres and the number of iall farms are constantly increasing. ie old land grants are expiring and e sold by the government for small rms on favorable terms of long time yments. Out of 240,000 holdings ly 822 are over 600 acres. Small ldings and co-operative marketing th excellent quality of product is ven as the main credit for their prosrity.

FILLS A PLACE NEEDED

J. E. Hall, Soperton, Ga., writes: Have just received copy of August sue of 'SOIL IMPROVER' and am ad to enclose my subscription. I n sure this paper will fill a needed ace in agriculture publications. Havg been a subscriber for a number of ears to the American Swineherd and und it valuable and was sorry when ou sold your stock, I hope the newsaper will be a success in every way. he most remarkable feature is that ou could not be satisfied without engaged in active service to farmers, alough at your age most men would etire and rest on past laurels. Hope ou may long continue to give helpful dvice and good cheer to our farmrs."

PLEASED TO KNOW

We have pleased a great number of armers in all sections of the country ho have had sows and cows about, o write them that "Kellogg's Aboron Cure" could be relied upon, as ures had been demonstrated in the ure of several hundred cases. Write I. W. Kellogg Co., 948 Carroll aveue, St. Paul, Minn., for their free ooklet.

A SWEET MEMORY OF PAST

E. C. Downs, Kalamazoo, Mich., a pecialty breeder and originator of the Velvet Strain S. C. Rhode Island Red Fowls, who has made a success as a reeder of these superior fowls, sends n a club of 16 subscribers for "BAYNE'S SOIL IMPROVER." Mr. Downs was acquainted with the editor thirty-eight years ago at Alexandria, S. Dak., where he was one of he staff in the American Swineherd ffice. His memory of the joyous work performed a third of a century ago with us is still sweet with him in hought.

FARMERS SHOULD READ IT

C. H. Eichman, Marine, Ill., enclosng year's subscription, says: "I read sample copy of BAYNES' SOIL IMPROVER.' It is a paper every farmer should read as it has many good pointers for better farming. Wishing you success."

SAMPLE WORTH YEAR'S SUBSCRIPTION

John C. Haag, Walkerton, Ind., enclosing 25 cents for "BAYNE'S SOIL IMPROVER" for one year, says: "The sample copy I got was worth more than the year's subscription to me; thanks for it."

ENLISTS FIVE YEARS

Dwight N. Ellis, Fair Haven, Vt., writes: "Enclosing $1.00 for a five-year subscription to 'BAYNES' SOIL IMPROVER.' If it is anywhere near as good as the Swineherd, which I have taken for several years, I want it."

FORGIVE US THIS TIME

In our August issue on page 4 under the title of "Encouraging Words," the printer spelled the name of the honorable veteran scientific agriculturist, F. D. Coburn, of Topeka, Kansas, wrong, which mistake we regret and ask pardon.

F. D. Coburn, by his successful achievements as an eminent agriculturist, also author of agricultural and livestock works, has become widely known and highly esteemed. The editor of the "Soil Improver" has enjoyed and treasured his friendship for many years as a distinct honor.

Dr. S. G. Burkholder, Reading, Pa., a subscriber of "BAYNE'S SOIL IMPROVER," in sending check for a copy of the new illustrated edition of Feeds and Feeding, by Professors Henry and Morrison, the leading authority in the United States and Europe on the feed question in every form and with all kinds of stock and is highly prized by the most capable and best feeders. The doctor states "that he was ordering through the advertisement in 'BAYNES' SOIL IMPROVER,' a paper of merit and interest."

ALFALFA HONORED

Dr. Perry G. Holden, who is a thoroughly practical scientist, thus defines alfalfa as the "Wonder Plant" of the farm world, "Alfalfa excels every other crop—in yield per acre—in feeding value—as a drouth resister—as a soil enricher."

Every farmer should make it a rule to grow some alfalfa on the farm. It works for the benefit of the soil free and gives you feed besides. It is company you can be proud to keep.

EUROPE'S FARMING CHANGE

There is a tendency in Europe toward breaking up big estates into small farms which is giving opportunities to those of small credit to own farms. They are supplying agricultural products that were formerly furnished from United States exports in many localities. There is every evidence that this will continue spreading and make a great change in their former methods.

Even Great Britain is yielding to the spirit of breaking up large estates into small farm holdings.

The real seeker after knowledge relative to the field and farm will grow by continually adding to what he knows, what some other person knows. Keep seeking and accumulating and not forgetting and your wisdom will surprise yourself, as well as others

POINTED LIME POINTS

If lime is needed, it costs more to do without it than to use it. Lime won't put any other plant food into the soil but it will help the plants to get what is already there.

It would be foolish waste if you put lime on your soil and then not grow legumes, and have the bacteria working for you. The man who puts off liming when his soil needs it is wasting a share of his life. In the present day most locations find it easier and cheaper to use ground limestone than the burnt lime.

PHOSPHOROUS FEEDS CLOVER

While Clover Will Feed Both Farm and Farmer.

Most Missouri soils need phosphorous. The results from a large number of experiment fields in Missouri show that the application of phosphates will, on the average, bring excellent results on clover. Their use will often insure a stand. They are best applied with the small grain crop, usually wheat, with which the clover is seeded. The use of 150 to 200 lbs. of acid phosphate or steamed bonemeal has been shown to give excellent results on the wheat crop and an almost equally good money return on the following clover crop.

And to grow more clover is now the settled purpose of many far-sighted farmers, for when once established this crop will build up soil fertility, fit into an ideal crop rotation, and increase permanently the earning capacity of every acre.

Exhibits, crop specimens and fields already benefited by these methods will bear out these truths in the Clover and Prosperity campaign of the Agricultural Extension Service, cooperating with ten eastern Missouri counties.

AGRICULTURE AT TOP

The total value of manufactured food products (practically all from raw agricultural crops) was four times greater in the year 1919 than the next largest manufacturing business, that of iron and steel.

Meat packing alone represents a greater value for one class of products manufactured, and that is produced from livestock, the backbone of agriculture.

No array of statistics is needed as argument to substantiate the statement that the farming business is first in the world's industry.—Mo. Clip Sheet.

FARMING IS FUNDAMENTAL

That farming is fundamental in the business of the world is made plain by the following words by F. N. Shepherd, executive manager of the American Bankers' Association:

"A prosperous America is in a large degree based upon a prosperous agriculture. The greatest producer and the greatest consumer—the American farmer—can not continue in an unhealthy economic condition without a reaction upon every other group."

THE "WHY" OF CLOVER FAILURE

By Dr. W. A. Albrecht, Acting Chairman Department of Soils

Now that prices are low we are losing our ambition to "cash in" with our farming business, but are turning our attention to the farm as a permanent place for a living, and concerning ourselves about keeping the farms productive. For land up-keep no single practice can do more than the growth of red clover and now, that attention is going in the general direction of keeping up the soil, much complaint has come that clover is failing more frequently than it did a year ago.

That clover is failing is far from being idle talk, and that clover is harder to grow is no vain dream. It is to be deplored that farmers are not willing to seed clover oftener. because no single crop has generally been introduced that can take the place of common red clover. Cowpeas and soybeans, of course, are good legumes. Both help the land and can be easily introduced into the rotation without much disturbance, but they can never take the place of red clover as a soil builder.

The Soils Department of the Missouri College of Agriculture recognizes the clover failures and says that on some lands there is one reason, on others two and at times even more reasons why clover doesn't grow.

Perhaps the first and most commonly cited cause of failure is the shortage of lime in the soil. In the corn belt or humid section with its 30 to 40 inches of rainfall there is ample chance for this to be carried away in the drainage water and sourness to be produced. Increased and continuous tillage also aggravate the trouble, to say nothing of the lime removed by the plants themselves. The whole process of cropping connected with natural phenomena works toward making the soil sour and lessening the chances for clover.

Another cause is the decreased soil fertility due to exhaustive systems of cropping. Every farmer has noticed how well clover thrives along fence rows and other fertile spots, while in the main fields it may do poorly or fail. Most soils need humus, they need phosphorus and where these have been taken out by cropping the clover is handicapped too much to succeed.

Weather conditions or the season often take the blame for colver failure and in some cases it may be correctly placed, but the records of the Weather Bureau do not indicate any changes notwithstanding the general belief to the contrary. It is true, however, that on soils heavily cropped and lessened in their fertility unfavorable seasons are more destructive to the clover than they once were. On poor soil clover cannot winter through.

The last important cause of clover failure is weeds. These are more numerous than formerly, because of the importation and widespread shipment of seeds of all kinds. Too many have come in with the clover seed itself. Only clean clover seed should be used, and co-operation given to the state laws aiming to give pure seeds, and thus eradicate the weeds from competing with the clover for moisture and plant food.

In spite of these causes that are all more active in bringing clover failures now than in times past, there is no reason for giving up hope. The use of lime on some soils, phosphates on others, both lime and phosphate on still others and manure always, will make clover a safe crop to grow. Once the crop is growing, the soil will improve and the crops grow better. We need clover crops badly and none other can substitute for it.

SEED CORN EXPERIENCE

The very best seed is available at ripening time, don't wait till husking time.

Drop all other business and select your seed corn, select enough for two years, as there might be a failure next year. When selecting seed corn give it your entire attention and select for the most important character, the power to yield well. Get the very best that is to be had and dry it promptly, and your increased yields will return you more profit than any other work you can do on your farm.

The only proper way to select seed corn is from the stalks standing where they grow, as soon as the ears are ripe and before the first hard freeze.

As soon as the crop matures go through the field with a bag (haversack) slung over your shoulder and husk the ears from the stalks that have produced the most good corn without having any special advantages, such as excess of space, moisture or fertility. Avoid the large ears on stalks standing singly with an unusual amount of space around them. Preference should be given the plants that have produced most heavily in competition with a full stand of vigorous plants. A well-balanced stalk bearing two long ears will usually be found to have produced as much grain as any other stalk. Both ears are equally valuable for seed, even though one may be smaller than the other.

Late-maturing plants with ears heavy because of an excessive amount of sap should be ignored.

In central and southern states, all other things being equal, short, thick stalks are preferable. They are not so easily blown down and generally more productive than the slender ones.

"The survival of the fittest" should be recognized and seed selected only from individuals which have produced best and most abundantly. Also from those which have resisted smut and other harmful diseases.

The same day seed corn is gathered, the husked ears should be put in a dry place where there is free circulation of air and placed in such a manner that the ears do not touch each other. This is the only safe procedure. Have repeatedly seen good seed ruined because it was thought to be already dry enough when gathered.

In every locality seen corn gathered at ripening time will be benefited by prompt drying. If left in the husk long it may sprout or mildew during warm, wet weather, or be injured by freezing. The vitality of seed often is reduced by leaving it in a sack or in a pile for even a day after gathering. During warm weather with some moisture in the cobs and kernels, the ears begin to sour in a short time.

A good method of drying the seed ears right after gathering is to tie a string around the center of the ear then five inches apart tie another ear and in the same manner tie five ears and then hang the string of five ear to a pole in a dry shed or loft. And string the balance of the corn in like manner.

The seed ears should not be allowed to freeze unless thoroughly dry After hanging two months the seed ears should be as dry as a bone. They can remain where dried or be stored in mouse-proof barrels, but in either case must not be exposed to a damp atmosphere, or they will absorb moisture and be injured. Some farmers place the thoroughly dried seed ears in the center of a bin and fill with loose dry wheat or oats. This protects the ears from rats and mice.—U. S. Dept. Agr. Bul. No. 1175.

HIGHER GRADE FERTILIZERS

Prof. W. A. Albrecht, acting chairman Department of Soils, informs us that the Missouri farmers during the past three years have shown by their purchases a continual improvement in the grade of fertilizers used.

The farmers using low grade fertilizers have been replacing them with high-grade goods at a remarkable rate For instance, the acid phosphate used in 1920 was 26.5, 1921 was 27.1 and in 1922 was 41.7. The Missouri farmers are progressive. While the agents are wisely pushing materials of higher quality.

Missouri State stands fourth in the number of acres of Indian maize; and first in Jewell Mayes, in the heart of the farmers of his state.

SLUDGE FERTILIZER

A plant for the treating of the sewage of Rochester, New York, was built before the war elevated prices at a cost of one million dollars. It covers an area of 315 acres. The sludge is produced by:

First, the sewage passes into the upper or settling chamber, where it stands for a period long enough for the solids to settle. As they settle they fall through a trap into a chamber below known as the sedimentation chamber, where they accumulate and digest, the gas vents at the side allowing gases to escape. The contents of the lower chambers are sludge. Sludge is allowed to accumulate through the winter months and is pumped out or run out by gravity during the spring and summer onto sand drying beds. The gases it contains keep it light and spongy. When dried on the beds it is a blackish, light cake that can be broken in the hands and smelled without offense.

An electric hoist, dump carts, a narrow gauge railway leading to a tipple provide the instruments by which sludge is dumped into the farmers' wagons. The carts are filled in the sludge beds, lifted to the railway and run to the tipple, built at the farmers' request for their convenience. When the tipple was built a higher price was charged for the sludge fertilizer.

The engineer stated that watermelon and tomato plant seed were the only ones in the sewage that would thrive in the sludge beds. On 'sludge days," when the dried sludge s removed from the beds, where it has been taking the air, the farmers stand in line waiting for their turn and complain because they can't buy more. It is in great demand by florsts and vegetable gardeners.

MORE ABOUT NITROGEN ON THE GENERAL FARM

Professor Agee writes about this farm, particularly to emphasize the need for nitrogen in the fertilizer as used on the general farm. For the benefit of our readers we reproduce what Professor Agee has to say about fertilizer results in this particular instance:

"The Pennsylvania State College has purchased a number of farms in past years, and I believe that its farm superintendent, Professor C. L. Goodling, is one of the best farmers in this country. The institution has rented one farm for ten years or so, and its story is as interesting to me as that of the noted fertilizer plats. This farm, when I first knew it, was strictly poor, and if it had been under quite ordinary farm management that involved the purchase of a little commercial fertilzer when crops were planted or grass seeded it would today be holding its own as a strictly poor farming proposition. No manure has been applied to this farm in the ten years, and there has been a regular rotation of corn, wheat and clover. The yields of grain have become heavy, and the clover this year, like that of several years past, is exceptionally good. If manure had been freely used upon this farm we should have expected to see good clover, as the lime requirement of the land has been met. Stable manure supplies nitrogen chiefly, and we all know that clover prospers with applications of manure. The scheme of fertilization provided that nitrogen should be supplied in the commercial fertilizer, and that has given the answer in the clover just as would have been the case with manure. There is no other way to interpret the results on the Mitchell Farm. Here lay that poor farm, lacking in soil fertility, and an application of 500 pounds of fertilizer per acre was made for the corn, and as it contained about three per cent of nitrogen and over three times as much phosphorus as nitrogen, together with some potash, the soil was temporarily given somewhat the character of a fertile soil and naturally had nothing to do but to produce a crop. I think about the same fertilization was given the wheat, and here was nitrogen along with the mnerals in sufficient supply to make the clover grow. That paved the way for the better yields in the next crop rotation, and the increase in the yields of the crops far more than paid the fertilizer bills while the land was changing from a poor farm to a strictly good one. This could not have come about without a free use of purchased nitrogen along with other things. This farm doubtless could get along pretty well with less purchased nitrogen from now on, because it is entirely out of the helpless class, and clover can do its full work, but it is an example of what tens of thousands of our poor farms could be if we would only supply enough nitrogen along with the mineral plant food to let the sod forget every third year that it was not getting any stable manure."—News Bulletin.

HAVE OAT VARIETIES TO SUIT EACH SOIL

Swedish Select for the light soils, Wisconsin Wonder for heavier soils in cool regions and State's Pride or White Cross for the heavy soils where the growing season is extremely warm is the best bet for oat varieties this spring, according to R. A. Moore, secretary of the Wisconsin Experiment Association at Madison.

"In order to have the least amount of lodging and as good a yield as possible, farmers should grow the variety best suited for the locality. As a rule, Swedish Select and Wisconsin Wonder are best in the northern three-fourths of Wisconsin and State's Pride and White Cross are best for the southern part," he declares.

"Wisconsin Wonder and Swedish Select are both large late varieties, and give very good yields, where the season is cool and moist. Wisconsin Wonder is a stiffer strawed variety and thus better on the more fertile, heavy type of soils.

IF YOU LIKE

BAYNES'

SOIL IMPROVER

TELL YOUR FRIENDS

IF YOU DO NOT LIKE IT

DO US A FAVOR AND

TELL US

"State's Pride, a selection of Kherson, a small yellow variety, has a short straw and early maturity. It escapes the hot, dry weather and can be grown on the heavy, fertile soils in the southern part of the state.

"White Cross is a new early white variety which will take the place of the early yellow. The market prefers a white oat."

SIMPLE FARM SCIENCE

Bread is made of wheat, but what is wheat made of? Everyone knows that animals must have food, but the fact is that plants must also have food if they are to grow and yield a harvest. The necessary food of plants consists of ten simple primary substances, known in chemistry as elements. Of these ten elements, five are supplied always in abundance by nature, by God. But "we are laborers together with God," and the other five are left for man to study, and supply if necessary.

The five elements always naturally well provided are carbon and oxygen (secured by the plant leaves from the air in the compound called carbon dioxid), hydrogen (secured from water absorbed by the roots), and iron and sulphur, both of which are taken from the soil and are naturally and permanently provided in sufficient abundance to meet the needs of large crops.

The five elements left for man's consideration are nitrogen, phosphorus, calcium, potassium and magnesium. These are secured from the soil by all plants, although under certain conditions nitrogen may also be secured from the air by one class of plant, known as legumes, including such as the clovers, lupines, vetches, peas and beans.

These ten elements are required to make plants grow, just as certainly as food is required to make animals grow.—Agr. Exp. Sta. Ills. Bul. 239.

BEST FED PEOPLE

"All Flesh Is Grass." Isiah 40:6.—Man, like other animals, gets his nourishment either directly or indirectly from vegetable food. As the quality of crops declines through impoverishment of the soil it becomes increasingly difficult to produce sufficient food of animals origin, meat, milk and eggs. Man is then forced to depend more and more on cereals and vegetables of gradually diminishing food value. Eventually there comes a time when the growing child can no longer get the substances needed for the growth of his bones, his muscles, and his brain from the food which he eats. The result is an adult imperfectly equipped both physically and mentally. The harmful effects of such a condition become intensified as generation follows generation and each crop of children starts life with its handicap of an imperfect parentage. If this condition becomes extensive, progress suffers. As an eminent authority has said, the people who have achieved in the arts and sciences have been the best fed people of the world. All of which simply goes to show why we must feed the soil to feed the crop to feed the beast to feed man himself. —John F. Lyman, Dept. of Agr. Chem. Ohio Agr. Col.

THE LITTLE OLD SOD SHANTY ON THE CLAIM

By Rev. O. E. Murray, Alexandria, S. Dak.

I'm quite seedy looking while holding
 down my claim,
And my plain eats are not always the
 very best,
While mice play round me as I lay me
 down to rest
In my little old sod shany on the
 claim.
Yet I like the novelty of living this
 way,
Though my bill of fare is not always
 eggs and ham.
But I'm happy on this land of dear
 Uncle Sam,
In my little old sod shanty on the
 claim.

This is furnished us by Comrade A. B. Brown, one of the pioneer settlers on the prairie before the town of Alexandria, So. Dak., was located or a railroad was in that part of the territory. There are some of the old timers left but many have passed on.

INTELLIGENT USE OF FERTILIZERS STEADILY INCREASING AMONG SUCCESSFUL AMERICAN FARMERS

Practical, Individual Field Experiments Determine Kind and Amount of Fertilization Needed, Thus Assuring Profitable Return on Fertilizer Expenditures

By A. B. Carson

Perhaps there is no subject of recent years that has aroused more heated discussion among farmers generally than the question of the use of commercial fertilizers. On the one hand it has been contended that commercial fertilizers are merely stimulants and that their continued use is bound, sooner or later, to have an impoverishing effect on the soil. On the other hand, all too many farmers have gone to the other extreme and used commercial fertilizers indiscriminately—naturally with indifferent success at best.

The real truth of the matter, as is so often the case, appears to be in the happy medium. The continued application of commercial fertilizers without the systematic use of other methods of improving the soil does unquestionably result in serious harm. For example, commercial fertilizers add practically no humus to the soil; at least not directly. And of course in order to obtain profitable results in crop-growing it is absolutely necessary to provide humus. This must be done either by plowing under green crops or by the use of barn yard manure. In this connection, many farmers have found that it pays to use agricultural gypsum which is now generally recognized as a splendid crop food for legumes.

Indeed it may here be stated that commercial fertilizers are not merely stimulants, but that they directly supply plant food and if used discriminately in accordance with the particular needs of the individual soil and the crop to be grown will leave the soil more fertile after their use than it was before. But the difficulty in the past has been that universal fertilizers have been widely used regardless of the fact that individual soils and crops differ so greatly in their characteristics and requirements. An economical use of fertilizers requires that they be specifically and accurately adapted to the individual soil and the kinds of crops to be raised.

There is just one sure, safe way of finding out the proper fertilizing material to be used, and that is to make individual field experiments. This can best be done by dividing a portion of the field into small plots. By using a different kind of fertilizer on each plot, the various yields will show the comparative results in terms beyond dispute.

While it is only by these individual field experiments that the farmer can learn how to get utmost economy and profit out of his expenditures for fertilizers, there are nevertheless certain general facts which he may well take into consideration. For example, many farmers are now beginning to revert with profit to the old practice of using rock fertilizers. Omitting nitrogen, which can best be supplied by the use of legumes, phosphorus and sulphur are the two plant nutrients most lacking in the soils of the United States that have been adequately studied. According to recent experiments with sulphur fertilizers, this is true whether the supply is measured absolutely or on the basis of crop needs.

In this connection, modern agronomy makes much of the fact that agricultural gypsum is rich in sulphate sulphur—that it furnishes crops sulphur in an immediately available and neutral form, in exactly the form that sulphur is applied to plants in nature. Consequently not a few authorities assert that, except for the occasional need of potash for certain soils and for plants of high potash requirement and the frequent need of lime to keep the soil neutral, the use of ground gypsum and ground rock phosphate in combination with legumes gives a complete fertilizer system.

The greatest use of rock fertilizers will no doubt be limited to general farming, for quickly available soluble fertilizers are necessary for profitable truck farming and intensive production generally even where stable or composted manures are available. Such forced crops must have an abundant supply of readily available nutrients. Even in intensive production, however, the general level of fertility could be advantageously raised by the use of such fertilizers in combination with agricultural gypsum.

WHAT IS A TON OF MANURE WORTH?

Trials made on the various experiment fields throughout the state by the University of Missouri College of Agriculture have shown that an average application of eight tons of manure to the acre once in four years has increased the yield of corn 10.5 bushels, oats 5.17 bushels, wheat 5.24 bushels, and clover hay 937 pounds. The full value of the manure is usually not obtained during the first four years, for it leaves the soil in better condition and its effect upon later crops is often quite significant. This becomes more noticeable after the first two or three applications, since a liberal application of manure every four years will result in permanent improvement to the land.

By very careful handling of manure a live stock farmer, on average soil, should be able to return annually, about two tons of manure per acre to his cultivated fields. It is not easy to save this amount except by very careful methods and persistent efforts. It is necessary that all straw and other suitable materials be worked through the barns as bedding. This not only adds to the comfort of the animals, but serves as an absorbent for the liquid manure. If straw piles are sold, burned or left to rot it is, of course, impossible to return this amount of manure.

Keep the manure together; don't let it get scattered about the barn or lots. Hogs and chickens may waste much of it. Where possible haul it to the field as soon as produced.

If this is not possible, store it in shallow concrete lined pits to prevent leaching. Use plenty of bedding in the stable or on the feeding floor to absorb the liquid. Straw, old hay, grass and leaves may be used for this purpose.

About 35 per cent of the nitrogen and 55 per cent of the potassium is to be found in the liquid material. There is, however, practically no phosphorus in this part. The plant foods in the liquid are all in soluble form and are very easily lost through leaching. Furthermore, the nitrogen in this liquid portion readily passes off as ammonia when manure is allowed to ferment, hence the necessity for preventing fermentation as far as possible.

The total solid and liquid manure produced in a year by a well-fed, mature horse is about eight tons, with a plant-food value of more than $30. In the case of a well-fed steer weighing from 1,000 to 1,200 pounds the production is nine to eleven tons, with a slightly greater total value than the manure from a horse.

Three to five months' exposure to the weather in an open lot may cause manure to lose approximately one-third of its plant food. If manure must be exposed to the weather it should be in a pit with a water-tight bottom.—Missouri College of Agriculture.

ROTATION OF CROPS

There are some professors who are so fearful that you might say or intimate that rotation of crops furnished fertility to the soil, that they stand on guard to halt you. However, it is no violation to state that rotation furnishes a service that is helpful to the soil and the growing crop. Especially in rotating with a legume performs some aid by changes of the soil's condition which permits availability of elements dormant and by destroying weeds. There is a value derived from the rotation.

GROW MORE SOYBEANS FOR FEED AND FERTILITY

There are ten good reasons why farmers in many sections of Wisconsin should try a limited acreage of soybeans. These are:

1. A majority of farmers in Wisconsin are having good success with them.

2. Soybeans are just a common crop for common people. It is not necessary to have a soil free from acid for good yields.

3. The best annual legume for medium to light soil is the soybean. It yields best on fertile soils, yet yields on light soils where other legumes fail to catch.

4. It is an annual plant—sureness of op is a certainty.

5. The soybean is the dual purpose ember of the legumes—an annual ed as a green manure, silage, hay, ed and pasture crop.

6. In feeding trials, soybean hay is ual to alfalfa.

7. Soybeans take no more moisture hen planted with corn than do weeds d the leaves make rich silage. The bor of caring for soybeans with corn no greater than for corn alone.

8. Properly cured, the crop is relhed by all stock.

9. Soybeans are easy to grow, as ey are not attacked by any serious seases.

10. Being a legume, the soybean uilds up soil by adding nitrogen.—Visconsin Press Bureau.

HE UNITED STATES HAS ADVANTAGES FOR ABUNDANT PRODUCTION

The history of the world has shown he transfer of leadership from nation o nation throughout the centuries. il Fillan, in the *Political Science uarterly,* traces the movement of ivilization and world leadership with eference to the mean temperature of he countries concerned.

World supremacy has always been n the northern hemisphere. It has, in he 54 centures charted, been moving ather steadily towards the cooler temeratures. This has undoubtedly been argely the result of the development f industry, thus enabling the human ace to thrive in regions in which primitive people without clothing or heated habitations could not have existed.

That the tendency seems to be continuing with practically the same rapidity is also significant, and may possibly be correlated with an as-yet-unpublished factor showing that the higher production of almost any given crop in our hemisphere occurs near the northern limit of its adaptation. This chart indicates that the United States is exceptionally favorably located with reference to world leadership at this time—shared almost equally, however, with England, France and Germany. No greater center of world leadership has ever developed in the southern hemisphere.

The United States possesses many natural advantages over the other nations mentioned, and if she wishes she may continue to increase her preponderance in power and influence until her position of national leadership will be unquestioned.

There seems to be no escaping the conclusion that the larger areas of the rich, fertile, and easily tilled land of this country have already been taken up and that the increase in farm area in the future will be relatively slow.

It is largely for the farmers of this nation to determine whether this shall be the nation of progress and achievement, because national progress in the future must rest even more squarely back on the food-producing power than it has in the past. The critical period in which a determination must be made is close at hand.

If this nation wants to go on increasing in power and influence as she has in the century past she must weight every factor in the problem of permanent development.

The third and probably the most important factor is the work of the Department of Agriculture, the colleges, the agricultural press, etc., in bringing up the standard of farming by the introduction of better crops and better methods. Of the total increase in production a comparatively minor part has as yet been due to increases per acre.—Soil Imp. Com. N. F. A.

ALFALFA AND CLOVER

The two genuine legumes, alfalfa and clover, have more real true friends than any other plant. The friendship is based upon the aid that the parties have received from these popular forage and hay plants.

Their double work is so helpful and satisfactory to those for whom they have sweat in their toil in building up the soil and furnished the rich food for the dairy and the porkers. The hay that is cut at the right time, then cured without being bleached from sun or rain, has that deep green color, a sweet odor and a savory taste that is incomparable.

No wonder the soil approves it and the stock respond to it and their friends were enabled to lift the mortgages and pay for their homes by their generous aid.

REALLY UNPLEASANT

Miss Wellalong—"I declare I begin to feel that I am growing old. It's really unpleasant."

Mr. Blunt—"It must be, especially for one who has been young so long."—Boston Transcript.

American Swineherd

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THE COUNTY AGENT THE FARMER'S TRUE SAVINGS BANK

The county agent, where wisely selected, is a veritable money-maker and saving bank for the farmers. One county in Iowa, by the report of a banker of the county seat town, reports that the county agent, through the association of farmers, buying for them and co-operating with them, selling the produce and buying the necessities, saved the farmers $150,000 a year, and further, by a seed corn campaign, had increased the yield of corn one year in the county three to five bushels to the acre, which amounted to one-half million extra bushels.

The county agent is always on guard to protect the farmers' rights. He is continually on the alert to stop the fellow who has been making it his business to trim the farmers.

The unconscious, heartless middleman, with only his selfish hunger for money to satisfy stands between the farmer-producer and the consumer and taxes them each without limit. The middleman's heartless profit, without labor, will be doomed by the man they dread—the county agent. He works in harmony with the Farmers' Bureau, as their interests are both the same, for the farmers' benefit.

BOOK FARMERS' FIGURES ON ILLINOIS FARMS

As manager of some 12,000 acres of central Illinois farm land my knowledge of conditions as they exist in agriculture today is naturally that of the landlord. The following table, which is a record showing the gross and net returns per acre since 1913 on a tract of 4,500 acres, furnishes some food for thought:

	Gross income	Exp.	Net income
1913	$ 6.60	$2.31	$ 4.29
1914	8.78	3.27	5.51
1915	9.54	3.68	5.86
1916	8.34	3.09	5.25
1917	17.30	3.61	13.69
1918	16.22	4.87	11.35
1919	22.81	4.18	18.36
1920	12.11	3.32	8.79
1921	7.07	3.19	3.88
1922	7.78	2.40	5.38

"The above returns are from good average corn belt land that can practically all be cultivated, where a systematic and well balanced rotation of crops have been followed, including a legume (clover for the most part) in the rotation. During this fifteen year period these farms have been well equipped with buildings, fencing, and tiling. This land has been efficiently famed by capable tenants, as is evidenced by the uniformly high yields that have been obtained. Often the yields are quite a few bushels above the average for the neighborhood. While these farms are primarily grain farms, the tenants have been encouraged to breed and feed live stock by fencing practically all the fields and the erection of silos, hay sheds, and cattle barns.

"In 1908 the tax per acre was in the neighborhood of 57 cents, while in 1922 the tax is almost $2 per acre, an increase of almost 400 per cent.

"At present prices this land is easily worth from $225 to $250 per acre. There is an investment of from $40 to $45 per acre in improvements, mostly of a permanent nature.

"The items that comprise the annual expense consist of taxes, insurance, new improvements and additions to existing ones, repairs and upkeep to improvements, fertilizer (including clover seed), expense of management, and other expense incidental to crops.

"From the tenant's viewpoint we know that his income per acre is about the same as that of the landlord, but from all the evidence that we have relative to the cost of man and horse labor, machinery expense, etc., it is apparent that the tenant has very little left for his labor and that of his family. The drifting of farm labor to the industries has the immediate effect of placing a decided handicap upon the farmers, but in the end the tendency will certainly be to bring about underproduction and increased prices.

"As to the prospects for the current year, it is true that the prices of some farm products have risen since the low point following the war. As it often happens, the rise in price of most farm products comes after they have passed out of the farmers' hands. The buying power of the farmer, which has been at a low ebb, cannot be increased unless he is to get a larger margin of profit, and at present any gain in prices of farm products is being more than offset by rising prices on nearly all commodities the farmer must buy."—Chicago Tribune.

FERTILIZATION PRACTICE PROVED SUCCESSFUL

Rational System of fertilizing by Penn. State College Professors, at Experiment Station after years of close observation.

Based on the evidence provided by the results, which were obtained on a four-year rotation—corn, oats, wheat, mixed hay—the following is stated to be a rational system of fertilization on the residual soils of the State of Penn.:

1. Corn: 6 tons manure per acre, reinforced with 250 pounds of acid phosphate.

2. Oats: On depleted soils, 200 pounds of acid phosphate per acre.

3. Wheat: 500 pounds per acre of 3-10-10 fertilizer.

4. Hay: No treatment the first year; 2d year, 300 pounds per acre of 6-8-8 fertilizer or a light application of manure.

Enough lime should be used to make possible a good growth of clover.

POULTRY AND EGG FIGURES

The combined farm value of chickens raised and eggs produced in 1922 in the United States is estimated at $854,207,000 by the United States Department of Agriculture. The value in 1921 was $900,820,000.

About 543,000,000 chickens were raised on farms of the United States in 1922, with a farm value of $354,199,000, as compared with 510,000,000 chickens raised in 1921 valued at $362,253,000. Egg production totaled 1,962,356,000 dozen eggs of a value of $500,008,000, as compared with 1,837,486,000 dozen eggs with a value of $538,567,00 in 1921.

Of the chicken eggs produced i 1922, large quantities were consume in industries in the manufacture c other than food products, and abou 113,000,000 dozen were used to pr duce chickens.

The average farm price of chicken raised in 1922 was 65 cents per fow compared with 71 cents in 1921, an with 86½ cents in 1920. The averag farm price of chicken eggs was 25 cents a dozen in 1922, compared wit 29.3 cents per dozen in 1921 and wit 44.4 cents in 1920.

There were 412,000,000 chickens o farms January 1, 1922, a time of yea when the number of chicks is low There were 386,000,000 chickens o farms January 1, 1921; on January 1 1920, there were 360,000,000, accordin to United States census figures.—Mayes C. S.

CO-OPERATIVE FARMERS' STRENGTH

The farmers of the United States acting together for their common interest, for the common good of al the people, have a power that is irresistible for the protection of thei rights without injustice to others.

All industries were ahead of the agricultural in guarding their rights and business concerns, which permitted some impositions on them being free from restraint.

The American Farm Bureau Federation is an organization of the American farmers, for their own benefit. To enable them to secure preserve and foster their just rights and privileges.

Their national character is broad and strong, it is governed by forceful, liberal minded, prudent, conscientious officers, who are laboring for the good of the great body of farmers, which will result in bettering their interests.

Their strong endeavors at this time is to improve the methods of selling the farm products. The difference in the price paid by the consumer and that received by the producer is too great. There are profits going to middle men that should go to the producers.

When the Farm Bureau organization is able to have the crops marketed orderly from one head, thus preventing jams and overcrowding, it will prevent sudden drops in the price.

All farmers should work in harmony with the Farm Bureau, giving it their united loyal support as members.

HELPED HIS TOMATOES

An Ohio grower of tomatoes for a cannery reports that 800 pounds per acre, of a 3-12-4 fertilizer on his ground upon which he grew his cannery tomatoes produced eight and a half tons of tomatoes per acre. A piece of land of similar soil adjoining upon which no fertilizer was applied, only furnished three and a half tons per acre. This shows that the good feed more than doubled the tomato crop, besides leaving the soil in better condition. This party demonstrated by his experience the value of fertilizing. Others may have the benefit of this knowledge.

WEET CLOVER IN MISSOURI

By Samuel M. Jordan, Farmers' Institute Lecturer, of the Missouri State Board of Agriculture, Jefferson City, Mo.

In this little bulletin about sweet lover I am going to try to leave out verything that I think not really ecessary to the man who desires to row it, or to the man who ought to row it. We shall not stop for scientific names, as just now we do not are whether it originated in Halifax r South Africa. The two questions hat do concern us are: first, why hould a man grow it? and the second s, how?

One reason for growing sweet lover is that it is one of the best soil builders of any of the plants that we grow. The abundance of stem, as well as of root, makes it possible for s to secure an abundance of vegetable matter to incorporate with our soil—nd let me say right here that the greatest one need of our upland soil n Missouri is more vegetable matter.

We should also grow sweet clover or the further reason that it makes n abundance of nutritious feed, especially when used as a pasture grass. n former years we thought it only a ad weed, and that no stock would eat t, yet we have learned the trick of eaching them to like it, and when hey have acquired a taste for it they re exceptionally fond of it.

As a pasture grass, when used alone, weet clover will produce much more han the ordinary season's bluegrass, yet I would not have anyone understand that I do not consider bluegrass one of the best plants in all the world.

My judgment is that the finest place of all for sweet clover is on our pasture land, growing along with bluegrass and other clovers and grasses. f we would only get to the point of owing other valuable grasses in our pasture lands, we would find that they ome to the aid of bluegrass by making a greater range of seasonal pasture as well as supplying nitrogen for the vigorous growth of the grasses.

When a pasture becomes once reasonably set with sweet clover, and if not pastured too heavily, enough of the plants will ripen seed each year to keep the land fairly reseeded.

The biennial sweet clovers are like red and alsike clover, in that they naturally die when they have matured a crop of seed. This is one of the reasons for sweet clover being a wonderful soil builder, because it has a very extensive root system that bores deeply into the soil, and when the plant dies it leaves a hole in the ground filled with vegetable matter of a high character.

Some care should be exercised in the pasturing of sweet clover, or any of the other clovers or alfalfa for that matter, as bloating may sometimes occur. So far as my information goes, however, live stock bloating on sweet clover is exceptionally rare indeed.

When sweet clover is to be used for hay, the cutting should be done before blossoming, for at least two reasons. The first is that if it is allowed to reach the blossom stage, or later, it becomes especially stemmy, and there is considerable loss in the feeding. Cut at the earlier stage it is rather difficult to cure, and if cut while in blossom we are more or less likely to kill many of the plants.

Up to the present time, another source of profit from growing sweet clover has been for seed purposes. It is a heavy seeder, and should be cut for seed when from perhaps one-half to two-thirds of the seed pods have turned black. The seed commonly shatters pretty badly, and for this reason the crop should be handled when it may be a little damp with dew. I think the best method of cutting for seed is to use a grain binder, if at all possible. When this cannot be done, however, the mowing-machine may be used. The threshing is done with a common separator, but the product from this machine is mostly in an unhulled condition.

Sweet clover is one of the best crops to grow preceding the sowing of the field to alfalfa. It will be found, also, that a piece of land when having grown sweet clover and the crop very largely pastured down for two to four years, that most satisfying results come from a corn crop that may follow, then allow wheat follow corn.

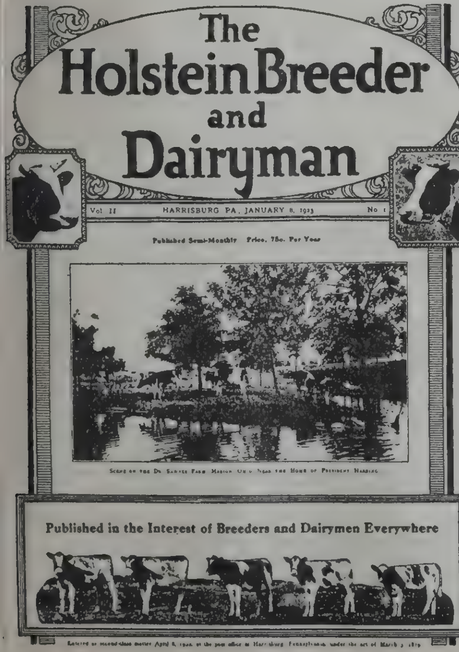
We find, also, that from the nature of sweet clover it seems to be able to take a great amount of potash from the layers of soil below where our common field crops feed. The potash, entering the tissue of a plant, and the plant turned back to the land, either being plowed under or fed off, we have increased the supply of available potash for other crops. For these reasons, since the Irish potato requires an abundance of potash it should be evident that this would be a good crop to follow sweet clover.

Last, but not least, sweet clover makes a wonderful pasture for the honey bee. A few days prior to the time this was written I was in Atchison County, and I found sweet clover growing almost everywhere in that county. The roadsides are lined with it, and many fields are out as a hay or seed crop. Others are using it for pasture, and if Atchison County only had the bees, that county would undoubtedly excel in the production of honey. They told me that they had forgotten all about the necessity of inoculating for either sweet clover or alfalfa in Atchison County. This means that this plant has so thoroughly inoculated the soils of Atchison County that farmers have practically no trouble at all in getting a stand of alfalfa almost anywhere.

Another fact should be mentioned, and that is that this plant has practically no insect enemy. The odor of it is undoubtedly repulsive to all insects, and this being true it is likely that those that find harbor during the winter would seek other shelter than that of sweet clover.

If we could have sweet clover growing along our fences and hedges, that otherwise grow up in weeds and grasses, it is possible that we would eliminate one of the great chinch bug harbors.

The foregoing reasons for growing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it should undoubtedly be enough to appeal to almost any farmer.

The next question to consider is, how can we produce it to the best advantage? On this there are a great many theories, and possibly some of them will work almost any time. There is, however, beyond much question of doubt, a very safe line of procedure.

But before we discuss this question attention might be called to the fact that this plant seems to have a characteristic the same as many others, that of growing abundantly some seasons and practically not at all in other seasons. This is especially true of pepper-grass, cheat, white clover, and some others. We of course say that this is due to some seasonal conditions, but just what those seasonal conditions might be I do not know that anyone knows.

This year of 1923 has shown a wonderful growth of sweet clover. Inquiries in various places indicate that where it is especially abundant this year there has not been much of a growth for the past two years. It is my judgment, that it is due to this characteristic that we have made many failures. If we knew ahead of time when it was going to have its "inning," then I think we could be reasonably sure of getting a stand.

It is my opinion, also, that the first great requirement is that a soil be inoculated for the plant. I believe that a soil well inoculated may contain a good deal of acid, yet produce sweet clover reasonably well.

The next requirement, perhaps, in importance is lime, and the next, reasonable fertility. We find that it grows well in inoculated, sweet soil, even though the soil be desperately poor. I have seen it growing on the sides of piles of limestone that had been ground for concrete on road work, and it seemed as though it was growing with nothing but the limestone about it. While it thrives reasonably well in many poor soils, it will thrive correspondingly better in good soils.

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There is little doubt but what in the preparation of the seed bed that this should be done as well as we would prepare it for alfalfa. This is especially true when seeding a piece of land for the first time. It means that the seed bed should be fine on top but well firmed below.

Possibly the best time for seeding is in the very early fall, similar to the time preferable for alfalfa. This gives the young plants time to become strong enough to endure the winter.

The seed of sweet clover have a pretty hard shell, and considerable time is required for many of the seed to absorb moisture enough to make germination possible. On account of this fact, machinery has been devised for scarifying or scratching the hard coat on the surface of the seed, in order that water may be more readily absorbed, thus giving a better and quicker germination.

The seeding should be done, in my judgment, with not less than 20 pounds per acre of the best seed. This may seem like a heavy seeding, but it is far better to have a seeding a little too heavy than to have a half stand.

I would caution, above all, in land not accustomed to sweet clover that if inoculating is neglected we are courting failure. Inoculation may be done by sowing a few hundred pounds per acre of soil from a thoroughly inoculated sweet clover patch, or the cultures may be secured from the soils department of the University of Missouri at Columbia at a very small cost—a cost so small that no person should hesitate one moment in using it. Sweet clover bacterial cultures may also be obtained direct from the United States Department of Agriculture, Washington, D. C., or from commercial companies direct or through seed retailers.

The lime requirement should be ascertained. At this time, ground limestone can be secured at almost any point in the state at no great expense. An application of limestone will often spell the difference between success and failure. Barnyard manure, when applied as a light covering, also does wonders with all of the clovers.

It is often desired to sow sweet clover to pasture land when these lands cannot be plowed, or it is not desirable to plow them. In such an event first determine whether or not these lands are acid. In case the land is acid, if we will apply from one to two tons per acre of ground limestone, with perhaps 200 pounds per acre of 16 per cent acid phosphate, then sowing a combination of sweet clover, red clover, alskie clover, timothy and orchard grass, after we have prepared these pasture lands for receiving them, splendid results are very sure to follow.

In preparing the land for this work, it can be done in the very early spring when the ground is soft. Make a disk harrow sharp, giving the disks very little slant, simply so they will gash the land rather than turn up the sod. Drive the disk in such directions that you will not make these gashes run up and down hill, but keep them as nearly on the level as possible. When this "gashing" is done, apply the limestone and acid phosphate, and then sow the
seed. All these will be washed mor
or less into the gashes, preventin
them from being washed away by th
spring rains. On pasture land, this i
one of the best possible practices.

Something should be said about th
annual sweet clover, or Hubam. Fro
my observations thus far, that variet
has a few advantages over the bienni
Being an annual, it is more likely t
produce a good crop without inocula
tion than the biennials, yet when w
are growing any legume that is n
inoculated we are not benefiting th
soil from the standpoint of nitroge
It is also possible that the seed of th
annual will germinate a little bette
and more readily than that of the bie
nial, possibly having softer hulls.
find that there have been relativel
very few failures among those wh
have tried this variety. It is a wo
derful producer of both seed and fo
age, and in my judgment the day
not far away when this variety wi
stand right up toward the front as on
of our important field crops, both as
feed producer and as a soil builder. I
the past the seed has been very expe
sive, and this has kept many fro
making the trial, but the time is no
past for fancy prices, and since th
price is reasonable there is no doub
in my mind but what any farmer ca
make it a most profitable addition t
his cropping system.

POTATOES LAMENT

With tears in their eyes,
The potato cries:

"The leaf hop has seen,
We're easy and green.

"Is camping where he,
Has eating all free.

"And prolongs his stay
'Till our life gives way.

"But he has no show
When given Bordeaux.

"It knocks him outright,
And puts out his light.

"Leaf hopper, good-bye;
We have closed your eye."

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W THE PLANT USES ITS FOOD.

plant is a body of cells—millions hem, just like your body. These s increase in number as the plant rges, grows. Every cell is an en- ed sac, holding within it the juice other substances necessary for its rgement and growth. The walls hese cells are made of cellulose—a oon compound, produced from the oon that enters the leaves from the

When the cell is first made the wall is thin and tender, just as we it in green and young plants, but hey mature the wall becomes hard woody and less appetizing and di- tible.

'hese plant cells are responsible for use of the food obtained from the and from the soil, for the building plant tissue and for the formation the compounds of the plant or the t of the plant.

'very live, active cell contains toplasm, the real life of the cell. ien the soluble soil materials—we l these plant food—have been car- d up through the long channels of ls and when they reach the leaves, y come in contact with starch ins and carbonic acid. Here these ious compounds are decomposed ough the action of heat, and sun- ht, and protoplasm, and chlorophyl: rch is made or changed into sugar, maybe starch or some starch de- ative is united with the nitrates and phur in some way so that protein ults, or maybe oil or cellulose or ide fiber is manufactured—each is de just as the plant decrees.

THE MEANING OF PLANT- JILDING.—Before these elements re enticed into the plant they were no value to man. He could not use em for fuel to cook his food or to ep his body warm; nor could he call on them for any special use.

But behold the change when the int takes them up! Without value the soil and air before, now the int calls them into use: tissue is ilt, which soon becomes food for in and beast; clothing for shivering blistered skins is now provided; elter for the strong and weak is now ssible; fire for a thousand uses is w ablaze; energy for the work of e world is now available.—Burkett ils.

SHORT STATEMENT ON THE NORBECK-NELSON BILL

By W. E. Gould,
ce-President, Savings Bank of Kewanee, Kewanee, Illinois.

What It Does

This bill provides that the War nance Corporation shall furnish a volving fund of $250,000,000 for the irpose of purchasing drafts against sponsible foreign importers, guaran- ed by their governments against the ipments of farm products from the nited States.

ow It Will Help—A Few Comments

1. Prices on farm products are low, it the greatest trouble is the rela- on between what the farmer sells and hat he buys. Measured in manufac- ired products, his crops are at the eatest disadvantage they have ever een.

2. When the farmer is at such a disadvantage, he has no purchasing power. There are 40,000,000 farmers who normally buy 40 per cent of the manufactured articles. With the farmers' purchasing power restricted, factories and labor suffer.

3. It is not additional credit the farmer so greatly needs at this time. What he needs to save him is a fair price for his products.

4. Higher prices can be obtained in three ways: First, by cutting production; second, by improved marketing; and third, by developing foreign markets. Not much relief can be expected immediately from the first two ways. Enlargement of the foreign markets, however, is practical. This bill makes it possible.

5. Europe is practically our only foreign customer. It is unable to buy for cash because we have one-half the gold supply in America. It can not buy extensively by exchange of goods under present conditions. The only way Europe can buy in considerable quantities is on credit.

6. Europe greatly needs our farm products and will buy from us rather than from other nations, such as Argentina, Australia and India, if we can give credit.

7. The Norbeck-Nelson bill does not provide that our government go into business of buying and selling, as some bills do, but only that it lend to responsible foreign importers.

8. This bill will provide quick relief as the War Finance Corporation machinery is in existence and ready for action.

9. It is our surplus in farm production that is causing our trouble. If we can export our surplus, prices will at once go up. We can not sell our surplus for gold, so we must sell it on credit or not at all.

10. The markets will immediately strengthen on the passage of this bill. We believe the price of wheat will go to $2.00 per bushel, corn to $1.00 per bushel, oats to 55 cents or 60 cents, and that other farm products will rise proportionately.

11. Corn is moving out of the farmers' hands at the rate of about 1,500 cars per day and wheat about the same. The farmers will get the benefit of the higher prices brought about by this bill if Congress will take quick action.

12. In helping the farmers by this bill we will help the whole country. The government will not lose in providing the use of this revolving fund, but will directly benefit through the greater general activity certain to follow improvement in the farmers' condition. The Norbeck-Nelson bill will stand all tests.

EGG-ZACTLY

For One Croppers to Consider Egg Values

The following quotation from a forthcoming bulletin soon to be issued by Jewell Mayes of the Missouri State Board of Agriculture.

Missouri's chicken population on 263,000 farms, January 1, 1923, was 23,713,930. The number of eggs produced in Missouri during 1922 was 106,900,600 dozens. Of the 1922 eggs 73 per cent were sold, and of chickens raised 38 per cent were sold.

EXPECT HIM TO WIN

The Soil Improvement Committee, National Fertilizer Association, state that Earl Hamilton, Cicero, Indiana, the owner of a 100 acre farm of good and is limiting himself to 25 acres of corn on account of the scarcity of labor. He has entered the five-acre corn contest conducted by the Indiana Corn Growers Association. He is broadcasting 300 pounds per acre of 0-12-6 fertilizer and 100 pounds of 2-12-2 in the row. He is guided somewhat in the use of fertilizer by the results obtained by W. H. Gilmore, of Ohio, who broke all yield records last year.

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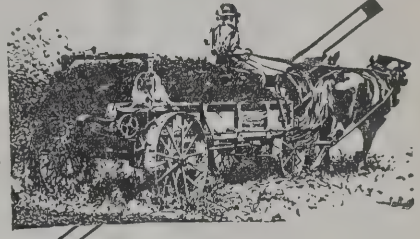

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THE RIGHTS OF THE FARMER

By Jewell Mayes

Several yeas ago, as a private citizen, Jewell Mayes, of the Missouri State Board of Agriculture, wrote the following words which were well nigh prophetic in sentiment, expressive of a then growing need that is now already partly realized, and which will continue to knock at the doors of Congress and the Legislatures until gambling and speculation in food products will finally be legally classed with the lottery and the roulette wheel as opposed to the rights of the farmer:

"The financial world, engaged in speculation on the products of the farm, is thoroughly well organized, and works as a great machine, gathering a harvest without sowing, threshing out bags of golden coin without plowing, planting or binding the golden grain in the fields, making too often the only measures of net profit, and that without the sweat of the brow, without toiling overtime, without risk of health, or sacrifice of family.

"For years the farming interests of this nation have demanded that the gambling element and speculative dealing in futures be stopped by the powerful hand of the law—but no law has been written into the statute books of the national government, because the great financial interests have cooperated together as if through the hand of one man, to the maintenance of their own interests, while comparatively few in number yet governing, checkmating, outgeneraling, outdistancing and preventing the farmers from becoming in deed and in truth the first beneficiaries of the net results of their toil"—Mo. Year Book.

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HAVE YOU A SILO?

The above question, of course, is addressed to the stockkeeper. If given in the negative, his answer would show reason as varied as the country is wide.

There are in round numbers five hundred thousand silos on farms in the United States. They are found in every state in the Union and in nearly every county. This proves that the silo can be used successfully in practically all part of the country. The man who is keeping live stock can well affard to devote some thought and study to this silo question.

Silage has been so thoroughly tested out from an economic feeding standpoint that most of our Experiment Stations have considered it a closed question. There are few states in the Union that have not printed bulletins and feeding tests, all of which show that silage is an economic feed for milk, beef and mutton. As to the amount it saves the feeder, no definite figures can be given, for prices of feed, labor and commodities vary with each year and in every state. It is safe, however, to conclude from the tests that have been made that at least ten cents can be saved on a pound of butter, forty cents on one hundred pounds of milk and one dollar on one hundred pounds of beef. With such a saving, surely this subject is a live one for every stockkeeper in this country.

Silage for young stock and growing animals is quite as valuable and important as it is for those that are producing milk or beef. Horses at rest, brood mares, colts and mules can be fed silage with economy. The five hundred thousand silo users of this country are perhaps the best experiment relating to the value and economy of the silo, for they have tested out its worth and know of its value and advantage on the average farm. The dairy industry has prospered during the past few years and many farmers are increasing their herds. They will find the most expensive part of the business is that invested in the feed bill; in other words, to feed a cow is the most expensive item connected with the business, and the silo is one of the first matters to consider for economical production and to give a succulent nutritious ration that can be drawn upon any time during the year.

The silo plays an important part in the process of turning the cheap forages of the farm into condensed marketable produce; and especially at this time of high transportation costs we will do well to engage in a line of farming that will condense our raw materials. We are especially interested in shipping a finished product, especially if the market demand is favorable. The silo has come and is still coming to the farmer who aims to utilize his products to the best advantage, who wishes to get the most from his acres and prevent a waste of roughage which has been so expensive in past years.

The silo is answering the pasture problem, for silage is the cheapest source of pasture. It is a labor-saving device, for it offers at all seasons a supply of forage close at hand. It can be easily and quickly transported to bunk or manger, and is relished by
practically all classes of stock.
rich in carbohydrates, it is succ
and makes a balance for high p
feeds or fodder.

The stockkeeper will do we
figure carefully the answer o
question, "Have you a silo?" H
secure plenty of information fro
owners. Our Experiment Station
furnish him volumes of data, and
are many other sources from wh
draw reliable figures. Too ofte
man who is considering this su
listens to the man who does not
a silo. From an investment stand
it will figure out close to a hun
per cent under many farm condit
Even if it figured ten, would it n
a wise move?

A. L. HAECKE

SURPLUS FLURRY

Mr. W. E. Gould, vice-presider
the Savings Bank of Kewanee, Illi
says: "Let it be known tomorrow
100,000,000 bushels of wheat is a
to be put aboard vessels for Eur
and you will find every baker
miller in the country entering the
ket without delay to take on suppl

"The Norbeck-Nelson bill will
found upon the closest study to be
most needed, most sensible,
practical and most immediately h
ful of all the bills now before
gress. While primarily for the fa
ers, it means benefit to all the o
people."

INDIANA FIVE ACRE COR
CONTEST

The Indiana State Agricultural
Experiment Station Departments
co-operative work are having a c
test of their farmers in raising
acres of corn.

If they meet with the success t
the ton litter pig club last season di
will be of great value to the corn gr
ers of the state. It is an enterpris
move for the advancement of the a
cultural interest of the state and
bound to be helpful.

The "SOIL IMPROVER"
anxious to help this progressive w
along. As one of our subscribers s
of us: "Your ambitions are high
everything but the price of the pape

A new booklet entitled "Handl
Wheat from Field to Market"
been issued by the "Southweste
Wheat Improvement Association,
New York Life Bldg., Kansas C
Missouri," and any farmer or oth
citizen may secure copy by writi
to the named address.

An ear of corn that weighed but o
pound, its longest row contained
grains, it was a good-sized ear. T
calculating scientist informs us, it
quired 310 pounds of water to produ
it, which is equivalent to 2.64 inch
of rainfall.

O, MY!

He—"I wonder how it is a girl can
catch a ball like a man."

She—"O, a man is so much bigg
and easier to catch."—Wisconsin O
topus."

ANALYSES FIGURES

By Wm. A. Albrecht,
Associate Professor of Soils

Your correspondent asks for the ex-ination of the meaning of analyses ures of fertilizers as 2-12-4, 4-8-6, 3-4, or 3-8-3.

Fertilizers are made to contain ainly three plant foods, viz., am-onia, containing the element nitro-n; phosphate, containing the ele-ent phosphorus; and potash, con-ning the element potassium. In elling the fertilizer or in specifying e plant food content for state in-ection, the figures used represent r cent of ammonia, phosphate and tash, respectively, in available or adily usable form.

For example, the figures 2-12-4, ove, represent a fertilizer that has per cent of ammonia, 12 per cent of osphate, and 4 per cent of potash. means that there are twenty times many pounds of each per ton, or 40 unds of ammonia, 240 pounds of osphate and 60 pounds of potash.

If you are buying a ton of a 2-12-4 rtilizer, you are buying 40 pounds ammonia, 240 pounds of phosphate d 80 pounds of potash. These fig-es are the means of knowing what e is buying and such labelling tells ore about the fertilizer than does me fanciful trade name like "Mar-llous Corn Grower." Fertilizer anufacturers are using the figures ore commonly and will do away th the trade names as soon as com-on practice and fertilizer talk uses e figures of per cent plant food con-nt more widely.

When one of the three plant foods omitted the figure 0 is used. A 12-2 means that the fertilizer con-ins no ammonia, but has 12 per nt of phospate and 2 per cent of tash. Potash is often omitted as in 2-12-0. It is well to learn the eaning of the fertilizer figures, for we do, we know what we are get-ng and the purchase of fertilizers ill mean getting so much plant food ther than "buying a cat in the bag."

DON'T LEAVE THE FARM

There is ofttimes a mistake made by e young sons of farmers in desert-g the farm for some other occupa-on. It frequently occurs because the ung man feels that there is not an portunity on the farm to develop d to meet with the success that is ely to occur in some other calling.

This is an age of progress and im-ovement. Farming as carried on the best and most successful farm-s requires the best talent, the deep-t thinking and as much wisdom and owledge as any other business.

There is a breadth and depth of ought exercised investigating and gging for the knowledge yet to be scovered and which is being utilized ntinuously. The farmer's son will d as great opportunity for benefit-g himself and his fellow-farmers and manity on the farm as in any other ace.

The farmer occupation has been ted up by the new processes and provement that are being adopted all times from the Agricultural olleges and Experiment Stations sources as well as from many private individuals.

In fact, there are so many widely different opportunities that no one person can compass them all, it is therefore better to confine oneself to a single line and make a specialty and success of it.

For a great many years the eastern farmers' sons have moved West to the benefit of cheaper lands of greater fertility and productiveness, thus improverishing the East by loss of their best elements and leaving aged parents to wind up their days with the farm running down until the cheapest farms are in the East. The opportunities to renovate them offer inducements for the farmer's sons. Farming has lost its drudgery, it is now one of thought as well as of muscle labor. As an indication of what can be done, we recently had detailed to us how a young farmer just home from college, purchased for a song an old orchard of twelve acres that had good trees on it, but neglected; they were trimmed up, the ground covered with manure and fertilizers. The trees were sprayed several times during the season; where the fruit was too thick it was thinned and at the end of the year he took more off the twelve acres than his neighbors did off of 160 acres. In fact, as much as some on the very best of soil got off of a big farm, showing that if the farmers' sons will give thought and look at home for opportunities that can be brought on some special line, there is no necessity for deserting the farm. The improvements which are marked already are destined to become greater each year from this time on. In every country the farming classes are the real bone and sinew of the nation.

FERTILIZED PASTURES

Aug. 28 issue of the Wisconsin Agriculturist contains an account of experiments extending over several years, which have been conducted in Ireland, in which cows were tested on manured and unmanured pastures.

The experiments consisted in the estimation of the improvement in pasture following the application of fertilizers in terms of milk yield. The results were obtained by grazing milk cows and comparing the yield of milk produced with that of similar cows grazed on an equal area of the same pasture which had not been fertilized.

The results of these experiments demonstrated that fertilizing pastures for milk production is profitable and that the carrying capacity of a poor pasture can be considerably increased by such treatment. It was found that even on poor pasture it was possible for cows to more than pay the cost of a fertilizer in the first season after application by reason of the greater number of cows the pasture carried.

In fact, the advantage gained by fertilizing the poor pastures lay not so much in the individual increase in milk yield per cow as in the additional capacity of the pasture.

Commenting on these experiments, the editor writes: "These results are of interest to every farmer who pastures his cattle. They leave no doubt that fertilizing pasture lands pay. It is neglected and overstocked pastures that always fail to keep up the milk flow during the Summer dry spell, and make it necessary to either feed high-priced grains or accept greater reduced monthly milk checks.—News Bulletin, Nat. Fer. Ass'n.

"I believe," said the cheery philosopher, "that for every single thing you give away, two come back to you."

"That's my experience," agreed Farmer Jones. "Last March I gave away my daughter, and she and her husband came back in August."

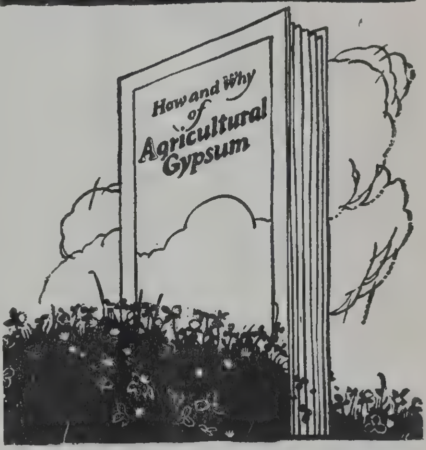
COPY PLEASED

Henry Worner, San Jose, Illinois, in remitting one dollar for five years' subscription for "BAYNES' SOIL IMPROVER," writes: "I was more than pleased with the sample copy sent me, thanking you for same."

WILY WOMAN

"So you persuaded your husband to join a glee club."

"Yes," answered Mrs. Bliggins. "When he starts to sing in the house now I can advise him not to tire his voice."—Boston Transcript.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Chicago, Illinois

American Farm Bureau Federation New

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

BRADFUTE STATES FARM BUREAU WHEAT POLICY

Storage Plan an Emergency Measure for Immediate Relief

"The Farm Bureau proposal that farmers withhold 200,000,000 bushels of wheat from the market is an emergency measure seeking immediate relief of the present market situation," according to O. E. Bradfute, president of the American Farm Bureau Federation. "This does not mean indefinite storage," continued Mr. Bradfute.

"We are urging farmers to hold their wheat for orderly distribution over the entire consumptive period instead of dumping it on the present low market.

"In doing this the American Farm Bureau Federation is counseling sound business policy. Storage will have a tendency to relieve the present situation and if a considerable portion of grain remains in the farmer's hand as a daily reminder of unprofitable surplus, plans for next season's planting will more likely be curtailed. Adjustment of acreage in line with world supply and demand is the permanent solution and our proposal is aimed toward that objective."

Reports Depress Market

Mr. Bradfute continued: "A flood of unfavorable statistics has taken speculative support from the market and financial conditions abroad prevent the heavy customary purchases for foreign account during the harvest season. Farmers must meet this situation by feeding the market gradually and it has been our hope that all the machinery created by the last Congress would be geared with all possible speed, to and in this endeavor.

"The Secretary of Agriculture is empowered to designate suitable warehouses which may be licensed and bonded and which may issue receipts to be used as collateral in obtaining loans in those cases in which the individual farmer finds credit necessary.

"It is our suggestion that a warehouse association be organized in each community or county and act in its corporate capacity as the official warehouseman under the federal law, leasing such storage houses as may be available at the country shipping points and such farm granaries as may be adequately constructed for designation as licensed houses. We believe this plan thoroughly feasible of administration in a way that will involve only the soundest business practice. We do not ask the Secretary of Agriculture to license unsafe granaries or the banks to extend loans not thoroughly protected. We do believe that Congress contemplated the fullest use of all facilities to obviate the very difficulties in which we now find ourselves and expected prompt action in making the warehouse and intermediate credit acts effective. This the American Farm Bureau Federation is asking and is offering its fullest cooperation in helping to achieve this result.

Undue Pessimistic Hysteria

"In face of official statistics which show only forty million bushels greater surplus in exporting countries this year than last and only sixty million bushels less requirements in importing countries the price has been carried twenty-five cents lower than the average for 1922. This additional surplus might easily be taken care of by expanding consumption in exporting countries and adding a little more to next year's carryover. The excessively low price, we feel, cannot be justified by the facts and has come partly as a result of undue pessimism and hysteria. The prospective buyer is pressing his advantage to the full by staying out of the market.

"We think that the present emergency can be wonderfully aided by the procedure we have outlined. However, each individual farmer must understand that he is using his own judgment in offering for or withholding from immediate sale. We cannot guarantee higher prices. But, as a matter of consistent policy we have advised from the beginning of our organization more even distribution of marketing by farmers over the consumptive period. Now that the machinery of orderly marketing has been made ready in so far as laws can prepare it, we want it put into motion through the administration of the laws.

"While the present price of wheat, far below the cost of production, is a calamity to certain sections of our country which rely quite largely on their one income, we are glad to note that the prices of some products are as good or better than last year. Cotton is higher; dairy prices are better; poultry products are holding even; cattle prices are running about the same; oats are stronger; corn is decidedly higher, but pork, in which form corn is most largely sold, is decidedly lower.

"From careful estimates, made by our Department of Research, of sales of farm products by farmers, it was found that wheat furnished from nine to twelve per cent of total income from crops, live stock and animal products. For the crop year 1922 income from wheat was estimated at 725 million dollars; cattle brought in 1,000 millions dollars hogs, 900; dairy products, 1,100; and cotton, 1,270. Fruits and nuts, vegetables and poultry each had an income value a little over half as much as wheat. Sales of corn run from 35 to 45 per cent as much as wheat.

"Preliminary estimates by our Research Department indicate that for the coming crop year gross income from total farm sales of crops, livestock and animal products will be about 100 to 200 million dollars more than the previous year."

GOVERNMENT SET TO AID WHEAT GROWE

Federation Progresses in Plan Assist Grain States Through Farm Storage

"The government machinery is n
'all set' to give farmers credit
grain stored in farm warehouses,"
cording to Gray Silver, Washingt
representative of the American Fa
Bureau Federation, upon receipt o
letter from Assistant Secretary of A
riculture C. W. Pugsley outlining
plan for farm storage of wheat wh
is practically identical with that wh
the American Farm Bureau Fede
tion has claimed to be entirely feasi
and practical under the intermedi
credits act and the revised Fede
warehouse act.

"The next move is up to the far
ers," continued Mr. Silver, "T
Farm Loan Board which administ
the intermediate credits act has n
fied the twelve intermediate cre
regional banks to accept wareho
receipts on wheat in warehouses
proved by the Department of Agric
ture. Now the Department of Ag
culture points to a very easy meth
of complying with its requireme
and storing wheat on farms.

"Assistant Secretary Pugsley sa
An individual or an association
partnership desiring to enter the p
lic warehouse business and which
meet the requirements may be licens
under the act. A plan for farm st
age within the law is along the f
lowing lines: A number of farme
in a community might form a c
porate organization. The vario
farm storages might then be leas
or sold to the corporation. The c
poration could then operate the v
ious units as a public warehousi
system. When the corporation me
all the requirements of the act a
the regulations, and when it is d
termined that the various units a
suitable for the purpose of the a
a license would be issued to the c
poration to operate the differe
plants. The corporation, howev
would be obliged to operate the diff
ent units as public storage places.

In discussing the possibilities
farm storage, Mr. Silver says:

Farm Grainaries Are Available

"It is entirely within the farme
power to await a market with 2
million bushels or more of whe
There are around 2½ million whe
farmers and at least 40 per cent ha
grainaries. If each of one milli
wheat farmers would store in the
farm bins only 200 bushels, th
would then be able to market in
orderly manner. This awaiting a co
sumptive market would act as a st
bilizer and the wheat farmer th
would be able to get the best pri
the market could afford.

"The warehouses, under t
amended warehouse act, might

ed individually or by a corpora-
. As already suggested, ware-
ses or bins on farms can be
zed, provided they conform to the
uirements of the warehouse act.
an individual partnership or cor-
ation desires to engage in the
lic warehouse business for the
pose of storing wheat or other
icultural commodities, it can be
e rather easily.

If farmers of a community should
ire to form a corporate organiza-
for the purpose of storing wheat
their farms, they can do so pro-
ing their storage bins are approved
a representative of the United
tes Department of Agriculture.
ıen these units are thus grouped
y would operate as a public ware-
ıse system after a certificate had
n granted by the Department of
riculture. The warehouseman then
uld issue receipts which would be
eptable to the local banker and
ich could be discounted by him
any of the twelve intermediate
dit banks. The receipts would
ow whether the wheat had been
ded or whether it is 'no grade'
eat. It would be inspected at the
e it was placed in bins on farms
d the warehouseman would be re-
onsible for delivery of the wheat
resenting the certificate.

Facilitates Loans

'The reason for storing wheat in
nded warehouses, of course, is be-
ıse bankers will lend money more
dily on wheat thus housed. These
rehouse receipts which the ware-
useman will issue on the wheat
ored in his warehouse may be taken
the local bankers and 60 to 75 per
nt borrowed on the current value
the wheat on farms in bins, in ele-
tors or at terminal points depend-
upon where the wheat is stored.
a farmers' co-operative wheat mar-
ting association wishes to borrow it
ould take the receipts direct to one
the 12 intermediate credit banks
ıere it can obtain a loan on the
ıeat at an interest rate of about 1½
r cent less than you as an individual
n get from the local bank.

"The local bank cannot well refuse
lend to an individual if certificates
m a bonded warehouse represent-
g graded or even ungraded wheat
e offered for the intermediate credits
t permits that banker in turn to
rrow on these receipts at the in-
rmediate credit bank. Further, the
nker will be glad to do this for he
n make as high as one and one-half
r cent interest profit on the loan
d use very little of his own money
that of his depositors. The 12 in-
rmediate credit banks take these
arehouse receipts and sell them to
e investing public and thus obtain
e money which they loan to the
cal banker or direct to the co-oper-
ive marketing association. The pub-
is anxious to buy the bonds repre-
nting these bonded warehouse re-
ipts which in turn represent the
tual wheat in bins housed under
oper conditions for they are one of
e safest and sanest forms of invest-
ent.

"In selling wheat we must keep in
ind that a single wheat crop repre-
nts more than the selling price of
e wheat. It represents the investment in land and equipment amounting to many times the value of the crop. And besides, wheat growing must continue year after year, except possibly in those regions of marginal production where admittedly the crop is a gamble and not an economic effort when viewed from the standpoint of the production of the bulk of our wheat."

In commenting on the wheat storage plan, President Bradfute said:

"The farmers of the west are much excited about the wheat problem and they are forcing their product on an unwilling market in order to meet their financial obligations," he said. "Under the warehousing plan they would be able to hold their wheat until the market calls for it and in the meantime they could get credit from the banks on their warehouse receipts. That is exactly what the wheat dealer or speculator does; we are simply asking the same privilege for the farmers.

Against Price Fixing

"I want it very definitely understood," said Mr. Bradfute, "that the Farm Bureau has never stood for any price fixing plan of any kind. It seems to us absolute folly to ask that the government fix a price on any product, farm or otherwise."

The first day closed with a banquet at the Hotel Ten Eyck attended by over two hundred delegates of the farm and home bureau federations. Banquet speakers were Peter G. Ten Eyck, former Congressman, and a director of the New York State Farm Bureau Federation; Mrs. A. E. Brigden, president of the New York State Home Bureau Federation, President Bradfute, and C. B. Hutchings, transportation director of the American Farm Bureau Federation.

The farmers of the east where keenly interested in what Mr. Hutchings had to say on transportation. "The transportation problem," he declared, "so far as the farmer is concerned, divides itself into two parts. First, it has to do with the cost of his transportation and is summed in two words, freight rates. The other factor is not so concrete and is often unrecognized, namely, service.

POOLS STRENGTHEN MARKET

Material strengthening in the wool market is evidenced by the rejection of a 46c bid for Bright Quarter Blood wool by the Minnesota co-operative wool marketing association last week.

The improved market is the indirect result of wool pools according to R. E. Jones, sales manager of the Minnesota co-operative.

The popularity of the wool pool in Minnesota is indicated by the fact that the Wabasha Minnesota Pool now has 900 members, twice the number of last year.

The Minnesota Association is arranging for an elaborate display at the Minnesota State Fair. A special effort will be made to explain to the growers the necessity of marketing only high grade fleeces.

Know the Facts

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BAYNES' SOIL IMPROVER
Webster Bldg., Chicago, Ill.

HOG MINIMUM REDUCTION SAVES HALF MILLION A YEAR

The Farm Bureau has won its hog minimum case. The Interstate Commerce Commission has ruled that, beginning October 13, 1923, 16,500 pounds shall be the prescribed minimum for loading of hogs.

Seventeen thousand pounds is the present minimum. The Farm Bureau was able to establish the fact that the 17,000 minimum increased the risk from overloading to a costly degree.

Federation officials state that with the new minimum savings in freight plus reduction in risk will average more than $1.50 a car.

In 1922 on twenty markets there was received 402,000 carloads of hogs. From these figures it is estimated that a yearly saving of $603,000 has been made for farmers who ship hogs.

A saving amounting to more than three times the annual cost of running the American Farm Bureau Federation.

PROSPECTS BRIGHTEN FOR GRAIN GROWERS

Prospects in the wheat market have improved in the last few weeks, according to the Department of Research, of the American Farm Bureau Federation. Estimates of smaller yields in the United States and Canada, the likelihood that farm feeding of low grades will make use of a larger fraction of the crop than usual, the possibility that the winter wheat acreage this fall will be materially reduced and distribution of the United States crop so that the supply is light in the states whose crops usually supply the milling centers and export trade were factors at work.

The August forecast of the wheat crop was 793,000,000 bushels or 69,000,000 bushels less than last year. The carryover of old wheat was 20,000,000 bushels larger than a year ago, however, making the total available supply 891,000,000 bushels or 49,000,000 bushels less than last year. Net exports (exports minus imports) in the twelve months ending June 30, 1923, were approximately 200,000,000 bushels and the domestic consumption for flour, seed, feed and miscellaneous uses totalled 642,000,000 bushels. This is 7 per cent above the five-year average and the largest on record with the exception of the 1915-1916 and 1919-1920 crop years when the yields were much larger than in 1922.

Small Export Surplus

Allowing for the same rate of domestic consumption in the coming year and for a normal carryover of 70,000,000 bushels, the apparent surplus for export would be 183,000,000 bushels, the smallest since the 1917-1918 crop year.

The amount of wheat consumed as feed varies from year to year, ranging from 25,000,000 to 65,000,000 bushels. The low price compared with corn has already stimulated increased use in this way according to numerous reports. Owing to the effects of rust and blight on the spring wheat crop and of recent rains on unthreshed wheat in the middle west, the percentage of low grades this year is rather high. At prevailing prices at the farm, it is logical to believe that unusual quantities will be fed and thus reduce the exportable surplus.

Reports to the United States Department of Agriculture upon intended plantings of winter wheat and rye just made public indicate 15 per cent reduction in wheat acreage and 9 per cent in rye acreage for the coming season.

President O. E. Bradfute of the American Farm Bureau Federation is anxious to secure first-hand information regarding the movement which he initiated to feed surplus wheat to livestock. He will greatly appreciate the service if each county agent will write to him at once, stating whether or not the farmers in his county are feeding surplus low-grade wheat to livestock, in what quantities, and with what success. Also President Bradfute wishes to know if farmers are holding wheat. Please address all communications on wheat feeding directly to

PRESIDENT O. E. BRADFUTE,
American Farm Bureau Federation,
58 East Washington Street,
Chicago, Ill.

CAPPER-TINCHER ACT NOT CAUSE OF WHEAT DECLINE

The Capper-Tincher Act, sponsored by the American Farm Bureau Federation as the proper means of restraining the undesirable features of speculative dealing on the grain exchanges, is not responsible for the decline in wheat prices, according to Secretary John W. Coverdale. If wheat is down for this reason, why should corn be up when it is traded in in exactly the same way and subject to the same regulations, asks Mr. Coverdale. He continues:

"Corn is around twenty-two cents higher than a year ago and wheat about fourteen cents lower. Hysterical interpretation of supply and demand statistics has carried wheat prices lower than the facts justify. Speculation on the exchanges is highly sensitive and has always been inclined to exaggerate the facts.

"In his administration of the Capper-Tincher law the Secretary of Agriculture has asked dealers to file reports of purchases and sales of individual customers in excess of 500 million bushels. If buyers kept out of the speculative market because they were required to file these reports why should not sellers stay out also. If both refrained from dealing their lack of activity would be offset on each side. Obviously it is wrong to try to hold the Capper-Tincher law or its administration responsible for present low wheat prices.

"Acting Secretary of Agriculture Pugsley states there is no restriction or restraint in the form of an arbitrary limitation on trading at the present time, and there is none in contemplation. Furthermore, notwithstanding similar agitation in grain trade for the past several months, our records now show that total volume trading in May wheat futures was in excess of same month in two preceding years. When present regula
under grain futures act were pro
gated Secretary Wallace issu
statement deprecating the persi
rumors which have come out of
markets to the effect that admin
tion of this law would drive oper
out of the market and cause s
decline in prices."

SAVING COST HANDLIN

The Chicago Producers Commis
Association is showing a healthy
crease in business in July, 1923,
the same month of 1922. There
an increase in cattle and calves o
cars, in hogs an increase of 487
in sheep increase of 67 cars, of m
stock an increase of 55 cars, a per
of increase of 137 per cent.

The Producers' business show
very substantial increase. With
first year's record of 11,780 carl
and a refund of 30 per cent, or $69,
which will shortly be returned to
shipper members, the Producers h
reason to feel proud of their org
ization in Chicago. Great things
expected this coming year, and if
increase in business continues t
will be a much larger refund to t
back to members next year. All
pends upon the support given this
ganization by the livestock produ
throughout the Chicago territory.

The Producer selling agency at C
cago has demonstrated clearly t
the farmers' business can be hand
successfully at a greatly reduced c

NEW PRESIDENT FOR N. C

H. H. Morehouse has been elec
as president of the North Carol
Farm Bureau Federation. Mr. Mo
house succeeds W. H. Pharr, w
was forced to resign on account
ill health.

SHEEP FEWEST IN YEARS

The Department of Agriculture
ports 2.4 per cent more sheep on far
in United States on January 1, 19
than the year previous, but with th
exception there is the smallest numb
since 1878.

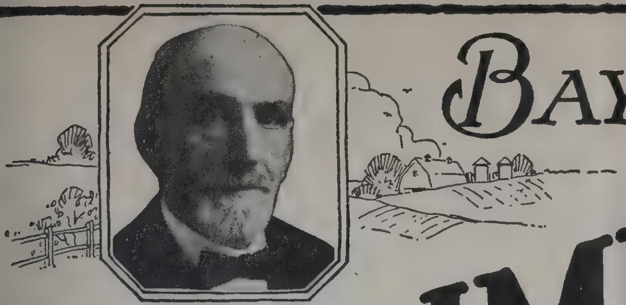
The manufacturers are using abo
three times as much wool as our d
mestic production, which was on
534,000,000 pounds. The price of wo
and lambs are good, and the whe
specialist farmer could benefit his co
dition by using a medium flock.

The New York farmers who pool
their wool this year will get the hig
est possible prices, F. E. Robertso
manager of the New York State She
Growers' Co-Operative Associatio
believes.

FOOLISH QUESTION

A negro cut off one of his to
while chopping wood. He went to
doctor's office to have the woun
dressed and as the doctor looked
it he said, "Sam, did you cut it o
clean that way at one blow?"

"Well, now, doctah," replied Sa
"do you think I'd take a second lick
it?"—Boston Evening Transcript.



BAYNES' SOIL IMPROVER

A MAGAZINE
Devoted to larger crop yields

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

ol. 1 OCTOBER 1, 1923 No. 4

THE COW THE PLOW THE SOW
PROTECTS DIVERSIFIED FARMING

They remove the hazard of depending upon a single crop, as was demonstrated this season to the farmers, who put their special trust in their crop of wheat. This carried two risks, one in the yield, the other the price, which was the frost this time.

The farmer, who calculated that simply by diversifying all things will favor him without diligent application and the use of good sense, is likely to be grievously disappointed.

It must not be forgotten that a fertile SOIL is the foundation that must precede success in the yield of the crops.

The productive farm affords the farmer a good bank account. At this date every farmer can by close attention qualify himself to feed the SOIL the scientific balanced ration to produce and maintain rich fertility which establishes the productive, profitable Farm and Happy Farmer.

Published monthly by JAS. BAYNES & CO., *327 So. La Salle St. Chicago, Ill.*

SUBSCRIPTION 25 CENTS A YEAR

TABLE OF CONTENTS

Page
A Good Name Is Above Riches.
Who Has the Farm........ 2

Elementary Study Course.
The Soil Contains the Food Elements 3

Editorials.
The Farm the People's Fortress.
Farmers Are Coming Into Their Own.
Step Up Out of the Rut.... 5

Soil and Pigs Compared.... 6

Soil Impoverishment Destroyed Rome.
Pure Bred Seed Produce Largest Crop............. 7

To Give the Soil a Fair Show 8

Page
Maintaining Fertility.
Reduce Wheat Losses...... 9

Development of American Potash 10

Wasting the Soil.
Pure Bred Good Seed...... 11

In Quest of Nitrogen for Agricultural Use.......... 12

Worth of Good Name.
Lincoln's Ideal Farming.
Quality in Soil Gives Quality in Crops................... 14

Keeping up Fertility with Hogs 15

Machines Take Place of Men.
Napoleon's Greatest Speech.
A Big Investment.
Progressive Farmer......... 16

Page
Manure from Bedded Animals Is Richer in Nitrogen.
Value Missouri Soil.
Lime Doubles Yields........ 17

American Farm Bureau Federation News.
To Study Irrigation.
Farm Bureau Radio Service.
Farm Electrification.
Co-op Marketing........... 18

A Bright Light Ahead.
Farmers' Co-op Exempt from Income Tax.............. 20

Highly Commendable Act.
Analysis Figures.
Chicago Market Center..... 21

Farmers' Big Profit........ 22

A GOOD NAME IS ABOVE RICHES FOR A FARMER

King Solomon's admonition: "that a good name is more to be chosen than great riches," is as sound, true and valuable advice today as when pronounced by the bibical king, famed for his wisdom.

A good name has the pure genuine golden ring that has caused it to be treasured above and beyond riches through all these past centuries.

A good name is a gem to be nurtured and cherished by every farmer. It is built by good acts, by "doing unto others as you would have others do unto you." Every transaction is anchored to truth and honesty, thus giving those with whom you deal confidence, reliance and trust in you.

In building the good name monument, by the continual treatment of all your customers in an upright, fair and just manner in every respect, engraves on the monument the effective and powerful word INTEGRITY.

We are only human and cannot expect to reach full perfection. The man with a good name may make a mistake sometimes, unintentionally, though, but he is always ready and willing to cheerfully rectify it, and is the most pleased of the two upon its correction.

They are taught with the knowledge and experience of others, thus qualifying them in engaging in the work. Thus the gate is opened into a scope of practice, thought and thorough reasoning, fitting them in accordance with their work, discoveries and results as farmers.

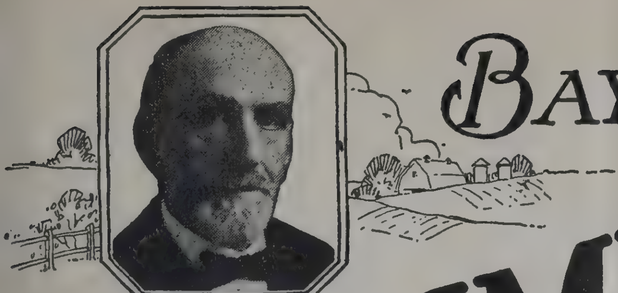
And as a farmer you have never lost sight of the undisputed truth of the adage "that a good name is above riches." Therefore, this bright token is woven through and enriches every business event during the entire period of your experience.

The supreme satisfaction of knowing that you have treated all your customers openly, fair, straightforward, free from deception or misrepresentation in all your dealings, causes you to fully realize the insignificance and littleness of riches, compared with the unlimited grandeur and value of a good name in which your purchasers unanimously appreciate, endorse and recommend and alwa
greet you with a welcome sha
of the hand.

WHO HAS THE FARM

We would like to have sor
practical farmer who is the own
of a productive farm that w
previously run down and its s
overworked until its value as
producer would not much mo
than pay the taxes. The prese
owner adopting a system of far
ing which has built up the f
tility enabling the farm to yie
good crops. Thus changing t
farm from a feeble weak soil
a strong vigorous fertile soil al
to yield good crops.

The farmer who brought t
change about is a practical w
business farmer. He is a mod
that is of great value to his co
munity. He can fulfil an oblig
tion of helpfulness to his broth
farmers by giving a description
detail of the manner of changi
the sick farm into a healthy vig
ous one. We will be pleased
help by publishing his demonst
tion. May we hear from t
party?



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

ol. 1 October 1, 1923 No. 4

HE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

he Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

LESSON 3

Plant Food in Crops—Available Plant Food in Soils

1. The nitrogen, phosphorus and potassium contained in some the most common farm crops are shown in the following table:

Nitrogen, phosphorus and potassium in some common farm crops:

Crop—	Nitrogen Lbs.	Phosphorus Lbs.	Potassium Lbs.
rn:			
bushels grain	50	8	9
tons stover	24	3	26
Total	74	11	35
heat:			
bushels grain	35	6	6
tons straw	13	2	23
Total	48	8	29
over hay, 2 tons	80	10	60
owpea hay, 2 tons	85	9	65
imothy hay, 2 tons	48	6	47
at cattle, 1,000 lbs	25	7	1

2. A little calculation will show
at about two-thirds of the nitro-
n and phosphorus and only
out one-fourth of the potassium
grain crops like corn and wheat
in the grain. The other one-third
the nitrogen and phosphorus
d three-fourths of the potassium
in the roughage (stalks or
raw). The roughage can and
ould be either left on the land or
se returned directly to the land
d plowed under or fed to farm
imals and used for bedding and
e manure returned to the land.
y so doing, the larger part of the
tassium and much of the nitro-
n and phosphorus taken from
nd in crops is returned to the
nd. So much of the potassium
n be returned in this way that
is is another reason why, on
ost soils, it is not necessary to
rchase potassium in the form of
rtilizer.

3. All the plant food shown in the crops in the table is taken from the soil with the exception of the nitrogen in the legume crops. (In lesson 1, we learned that legume crops, such as the clover and cowpea hay crops in the table, are able to use the air nitrogen.) Soils naturally fertile usually contain as much as 4,000 pounds of nitrogen, 2,000 pounds of phosphorus and 25,000 pounds of potassium in the surface acre two million pounds. Outside the Bluegrass region most of the soils of Kentucky contain, in this acre surface layer, as we have found, only about 2,000 pounds of nitrogen and 800 pounds of phosphorus and about 30,000 pounds of potassium. If the plant food in the plowed layer is all the crop can get, as it is for the most part, then these soils contain enough nitrogen to grow a little over twenty-seven 50-bushel corn crops (for example, 2,000 pounds in the plowed layer ÷ 74 pounds in the crop=27+crops of corn), and only enough phosphorus to grow about 73 such crops, though there is enough potassium to grow 857 such crops.

4. It is not possible to grow 50-bushel corn crops until the nitrogen, phosphorus and potassium or other plant foods in the soil are entirely used up. Indeed, a 50-bushel corn crop is a pretty big crop to grow at all on the average Kentucky soil. The plant food is there in the plowed layer even of the lowest one, nitrogen, to grow more than a thousand bushels of corn, and yet during any one year perhaps only a 40-bushel can be produced. Very plainly one crop is able to use only a very small amount of the total plant food in the soil. Most of the plant food is held in the soil in such shape that any one crop cannot get it.

5. Would you like to know what change must take place in the soil plant food before plants can get it? Water from the soil is constantly going in through the roots, up through the stems, and evaporating from the leaves of growing plants. A single large corn plant may evaporate as much as one and one-half quarts of water in a day. The water that enters the roots is not pure water, but contains certain things dissolved from the soil. If you were to put a little clean white sand into clear water, no apparent change would take place, but if you should place a little sugar in the water, in a short time it would all disappear. The sugar has dissolved or gone into solution. Now, as a mattter of fact, the sand, too, goes

into solution a very little bit, but not enough for one to notice it. The plant food in the soil is going into solution very slowly in the soil water in just this way, and it is only as it goes into solution in the soil water that it can be taken into the plant with the water and be used by the plant.

6. We call this plant food which goes into solution in the soil water and can be used by the plant, available plant food. Plant food becomes soluble, or as it is more often called available, very slowly. During an average season on an average soil farmed in an averge way, probably, for every 100 pounds of nitrogen in the plowed layer, 2 pounds become available yearly; for every 100 pounds of phosphorus, 1 pound becomes available, and for every 100 pounds of potassium one-fourth of a pound becomes available. This means that, in an acre of the average Kentucky soil, with 2,000 pounds of nitrogen, 800 pounds of phosphorus and 30,000 pounds of potassium in the plowed layer, 40 pounds of nitrogen, 8 pounds of phosphorus and 75 pounds of potassium become available yearly. Forty pounds of nitrogen is enough to grow about 27 bushels of corn, 8 pounds of phosphorus is enough to grow about 36 bushels of corn, and 75 pounds of potassium is enough to grow 107 bushels of corn. From these figures, nitrogen is seen to be the first plant food to limit crop yields, with phosphorus not very far behind. Pottassium is supplied in large enough amounts to grow big crops.

7. Since the plant food supplied in lowest amount determines the size of crop that can be grown, on this average Kentucky soil, farmed in an average way, we would expect that 27 bushels is as large a crop as could be grown. The average actual yield of corn in Kentucky outside the Bluegrass is not over 28 bushels per acre. The main reason why this average yield is not higher is because the crop cannot get enough plant food to grow more. If enough plant food is available it is just as easy to grow 75 bushels of corn per acre as it is to grow 28 bushels, if other conditions are favorable. One should not be content to grow on an average less than 50 bushels of corn per acre, 20 bushels of wheat, and corresponding yields of the other crops.

8. There are only two ways whereby a farmer can increase the crop yields on soils low in any of the plant foods. One is by farming his land in such a way that larger amounts of the plant foods are made available from the supply already in the soil. The other is by increasing in some way the actual supply of plant food in the soil. When a soil contains fairly large amounts of plant food, as most soils do of potassium, the farmer should use the first way; that is, farm so as to make a larger amount available. But where the soil is low in plant food, as most soils in Kentucky are in nitrogen and phosphorus, the farmer should use not only the first way, but the second also; that is, he should in some way actually increase the supply of plant food in the soil. We will find out how he can do this in later lessons.

QUESTIONS FOR STUDY: In what part of grain crops is most of the nitrogen and phosphorus found? 2. Most of the potassium? 2. What is meant by available plant food? 6. On the average, how much nitrogen, phosphorus and potassium becomes available yearly? 6. How large a crop should one try to grow? What are the two ways whereby a farmer can increase his crop yields? 8.

LESSON 4.

Things Which Help to Make Plant Food Available

1. In Lesson 1, we learned something of the eighty simple elements and how they make up every material that exists merely by combining in different ways. Perhaps you thought that when once elements form a combination, they always remain this way. This is not true. The elements are continually going from one combination to another. The plant food elements in the soil are no exception to this. They are all the time changing about, and in so doing every now and then form a combination which is soluble in the soil water, or available and can be used by crops. However, the amount of available plant food formed in this way would be very small indeed were it not for something which greatly increases the process.

2. You know more or less about many plants and animals. You know that some are large and some are so small that they can scarcely be seen. I wonder if you
know that there are very ma
plants and animals still smaller
so small, in fact, that they can
be seen at all with the eye alo
and can only be seen by the use
powerful microscopes.

3. Indeed, there are more
these very small plants and a
mals than of the large plants
animals. They live, reproduce
die much the same as other pla
and animals, though much m
simply, of course. They do ma
things, some of which are v
useful to man and some v
harmful. They cause canned fr
and milk, for instance, to sour,
all kinds of fruit to rot. They
the cause of most disease and
all decay. In fact, they bring ab
many of the changes for wh
we can see no other cause. Cou
less numbers of these small pl
and animal forms live in the s
The name, bacteria, is given
most of this small life in the
and elsewhere.

4. The work of these v
small forms in the soil causes
soil plant food to become availa
for plant use. In reality, due
their work, the soil is very slo
rotting or decaying, as one mi
say, and as it decays, the pl
food becomes available for c
use. This change goes on m
rapidly in the surface soil, sinc
is here that most of these forms
life exist.

5. Just as with larger pla
and animals, so these very sn
forms must have the right con
tions before they can live

(Continued on page 20)

EARLIEST FERTILIZER

Among the earliest fertiliz
we find that in the days wh
Rome was establishing her su
riority as an Agricultural coun
and gaining distinction by
bountiful crops which were
tributed largely to the use of g
sum as a fertilizer.

Gypsum was one of the ea
commercial fertilizers used in
United States. When as wis
philanthropist as old Ben. Fra
lin, who was always seeking
serve mankind, used gypsum
strongly endorsed it, shows
value.

Ex-Vice President Marsh
quite a prominent author, sa
"One of the most difficult thi
for a person with his own opin
to accomplish, is to convince hi
self that his opinion is wrong."

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EDITORIALS

THE FARM THE PEOPLE'S FORTRESS

The farm sustains the life of the people by producing from the SOIL essential nourishing food for their vital animated existence.

Not only the safety, but the lives of the inhabitants of our country are fortified by the customary produce of the farm, from destruction by starvation.

The soil of the farm possesses the life-giving power which is perpetuated by the farmer feeding it, and thus controlling the power.

This brings the farmer into pre-eminent prominence. By the farmer using this power co-operatively it would exceed all other peacable power.

The productive SOIL through its bounteous yields is the fountain head and promoter of all industries and other business. Confucius wrote centuries ago—"The well being of the people is like a tree—agriculture is its root, and manufacture and commerce are its branches and leaves. If the root is injured, the leaves fall, the branches break away and the tree dies."

The occupation of the farmer is one of the highest rank. The farmer who uses his best efforts of mind and muscle is in partnership with nature in his work, and the revelations occurring will be astonishing to himself as well as others. We have no doubt that Burbank has many times been surprised at his own achievements.

This is a progressive age and it behooves our farmers, young and old, to qualify themselves for their own benefit and success. The Agricultural Colleges and Experiment Stations of the states are doing splendid work in behalf of agriculture. "BAYNES' SOIL IMPROVER" will advise its readers through its columns each month of the various valuable useful and practical improvements beneficial to them.

The advance of civilization is accompanied with a higher tone in the character of the eatables.

The American farmer at the present time can well be proud that his country leads the world in the extent and quality of her agricultural products.

One of the propensities of the times not only in this country but in Europe is to reduce the size of the farms. Thus enabling many renters to secure farm homes of their own. This is not only helpful to them but removes the unstableness that is ordinarily attached to the tenant. It is an advantage to the community, county and state. The farms operated by free-holders is beneficial to the individual and to the public.

FARMERS ARE COMING INTO THEIR OWN

Agriculture is the foundation for the necessary supplies for the life, health and happiness of the inhabitants of all countries. The Agriculturist, commonly termed farmer, occupying a position of the gravest importance to the whole community, justly deserves to receive a profitable remuneration.

The farmer whose skill in cultivating the soil produces the food for the nourishment of the people engaged in all other employments; is asking for only what he is willing to grant these different occupied persons.

In the development of agriculture by cultivating the soil and increasing its fertility, to enable it to enlarge its yield of food and raiment crops, constitutes our largest industry, and if it is made profitable it is a solid foundation step for acquiring lucrative gain in other deserving industries.

The whole of our country's inhabitants are interested in the progress, success and profits of our farmers. The thrift and prosperity of the farmer empowers him to add to the natural beauty and value of the farm, and the charms of his home and its surrounding. A flourishing condition brings with it the ability to furnish means for educating the farmers' families, at least equal to any other class of citizens.

After the people engaged in virtually every other vocation had organized to protect their rights and act in harmony through their official body, the farmers have instituted theirs.

The American Farm Bureau Federation, national in its breadth, with powers to aid and protect their property and mutual interests and specially favoring them in selling their product and also in buying their necessities. The two first presidents, Messrs. Howard and Bradfute have shown marked ability and prudence in the execution of their officees.

By acting as a whole in unison, it will enable the farmers to have a greater equity in the pricing of products. The Co-operative Commission Agents brings the members remunerative dividends and is progressive in selling the farm produce.

The farmers are making progress in coming into their own.

STEP UP OUT OF THE RUT —WE EXTEND OUR HAND.

The farmer who is resting, satisfied that he has a full knowledge of his business, is blundering, is committing a grave error. He is in a fair way to be passed by an enterprising, wide-awake, eager-to-learn neighbor.

The man who relies entirely upon his father's ability, and who knows what his father knew, all of which is good to possess, and because of this knowledge, feels it unnecessary to desire to know any more, is already a back number in this day. This action would prevent progress.

If we were contented with knowing only what our parents knew on the line of farming, and without ambition for advancement or desire to get out of this rut, we would be farming with crude implements that have been long since out of date and discarded. This would be an obstacle to advancement.

In 1840, the President of the United States, Senators and Congressmen, bankers and shrewd business men had so little faith in electricity and its practical use that Prof. Morse pleaded with them for four years to get support to build a line of wire for the short distance between the cities of Washington and Baltimore.

The various advancements have used electric power to knit the world's cities, towns and villages for wire messages and furnish light for public and private use. Now wireless radios enable the listening to sermons, speeches, and singing in your own homes from many hundreds of miles distant. Electricity furnishes power to run autos, car lines and numerous other machinery. All of which show the ambition and enterprise that is necessary to bring about progress.

With all this most wonderful advancement in electrical knowledge, today we are only on the verge of our investigation and production with this marvelous power. Yet all the achievements were based on principles that were just as true one hundred or five hundred years ago. It will be no more astounding in the future to be supplying all our heat, light and power for additional purposes by electric current, using the natural water power to furnish the electricity.

The real progressive farmer has by successful steps reached this advanced position, while a new era of improvement is continually opening to the seeker and investigator for advancement.

Changed conditions are confronting us at all times. We have been increasing our aggregate yields of foodstuff and are now at the apex. To keep up production will require feeding the SOIL to enable it to have the strength in fertility to keep up and increase the aggregate yields. The restive farmer for greater knowledge is the wise and enterprising person who will keep us progressing.

The population will keep on increasing, demanding larger amounts of foodstuff. About 15 years ago the widely known railroad man, James J. Hill, a capable business person of broad vision, was speaking to farmers over the country to alarm them of the danger of failure of the meat supply of the country on account of population increasing faster than the live stock.

The feeding of the SOIL with many farmers is in about the same condition as the feeding of the scientific balanced ration to hogs thirty years ago. There is the same necessity of having the soils ration a scientific balanced one.

Measures of economy, questions of feeding, of cheapening the feed and of producing everything on a more profitable basis, are questions open for everyone to consider.

The different subjects are specialized, that everyone may have a concentration of thought and greater power from these efforts to bring about the best conditions for the success of each undertaking is now the rule.

The "BAYNES' SOIL IMPROVER" is a specialist on the soil, the real heart of the farm. The farm that is without soil is like the lamp without oil. Both unable to serve you. The lives of the people depend upon the soil, rendering it of the greatest importance directly to the farmer and indirectly through the farmer to everybody else.

All matters for improving the soil to enlarge the yield of crops by the various methods of increasing the fertility are described and explained from practical methods of the farmers as well as the scientific professors of the Experiment Stations.

Every farmer subscribing at 25 cents for the year also gets the benefit of the five months' schooling in lessons we are publishing from the Study Course used by the Junior Agricultural Clubs of the Kentucky Agricultural College. We can start you with the September issue, which carries the first lessons.

A number of subscribers have stated that the sample copy received by them was worth more than the year's subscription. We thus offer our hand to help any one up out of the rut, and into good company of ambitious farmers.

SOIL AND PIGS COMPARED

Thirty years ago feeding pigs scientifically was not understood by ninety-five per cent of the farmers. True, the pigs were being fed in growing them and fattening them for the pork market.

There were some farmers who had skim milk from the dairy with good clover pasture and in which corn was added that were truly successful feeders because they hit on a fairly balanced ration, as the hogs would see mineral in the field. These feeders knew that each of the thre feeds were proven good ho feeds without a knowledge of th necessity of the various element the hogs required to construc the growth of their bodies.

Prof. Deitrich, who studied th question in a scientific manne stated that a majority of th farmers wasted one-fourth of th corn they fed their hogs. Because they fed them only cor and the hogs in their endeavor t secure more protein were compelled to eat too much corn an thus wasting the un-needed pa eaten, 100 pounds containg pounds protein and 66 pounds o carbohydrates.

At that time no one would hav attempted to go into the busines of hog raising for the pork market in a section where corn wa not raised. It was not know then in the corn states that a falfa and clover hay were goo hog feed in balancing the ratio

On account of the genera feeder not understanding the ne essity of mineral feed to gro and strengthen the bone in dri ing the fat hogs to the statio loading and shipping them to th stock yards, feeders suffere heavy losses from broken legs, a the down hogs were almost who ly a loss.

Prof. Henry in placing a so in a close pen with a board flo and feeding her only bolted flo and giving her rain water to drin she was soon unable to stand u on account of the weakness of he bones. Then upon sprinknlin wood ashes in her drinking wate caused the strengthening of th bones again. Thus demonstra ing the necessity of mineral t grow the bones and to maintai their strength after growth.

The hog must be fed tha which produces bone, sinew, hai muscle and flesh both lean an fat. If there is a shortage of an one of the elements to meet thes requirements in the feed give there will be a failure to produc the corresponding element, as th hog depends upon the characte of feed he eats for his growth an strength of muscle and bone.

The general farmer as well a the breeder of swine understand fully today the necessity of feeding the pigs and hogs a balance ration for their benefit to produc the best, quickest and most ec omical growth and profit for the eeder.

The feeding of the soil today s with many of the farmers where he feeding of hogs a balanced ation was thirty years ago.

They know that manure is elpful although there are some vho are not as careful as they should be in saving it and applyng it to the soil as it should be, or do they have the scientific nowledge of the elements of feed he soil needs to grow the various rops. And it may be a minority f them may not understand the enefit of the legumes and rotaion of crops. They apparently ave not realized the necessity of seeking knowledge of this character.

We are anxious to aid in suplying the readers of the Soil Improver the scientific truths benefiting farmers.

SOIL IMPOVERISHMENT DESTROYED ROME

Every country and nation is vitally interested in the productiveness of the soil. It is the foundation of the health and prosperity of the nation.

A remarkable pamphlet discovered among the Roman archives, the author of which was Vladimir Sinkovitch, in which it is shown that a chief factor in causing the fall of Rome and then of the Roman Empire was soil impoverishment and exhaustion.

Rome achieving her greatness through her Agricultural superiority, then brought on her downfall by the neglect of their farms and placing their dependence on their soldiers.

This country has reached the limit of the wasteful use of an overworked soil, to produce crops without feeding it. We have drawn upon the original resources until it is bound to be reflected in its impoverishment to a certain extent annually, unless we come to its relief and supply it with that which is needed to recuperate and maintain with added interest an improvement, and thus build up and restore its original productiveness. The achieving of this victory would give us a new base, from which to continue driving on the lines of progress and forcing three times the yield that grew before.

The efforts to determine the best methods and plans to be adopted to keep up and improve the qualities of the soil for producing a larger yield of crops is going to be one of the great problems and requirements of the farming humanity for the future.

We feel confident that the enlightened farmer of this day with the help of the Agricultural Publications and the assistance rendered him by the government in the various Agricultural Institutions and Experiment Stations, will be found equal to meet the necessities of the times. We shall profit by Rome's errors and shortcomings.

Whenever a great cause affecting the interests or life of a nation is in peril, leaders with capacity to meet the necessities of the occasion rise up and save the cause and solve the problem in a practical manner.

There are those now among the scientific Agricultural students who by their devotion and concentration of thought, will achieve success and fame on this line, and win the applause and gratitude of the nation and become renowned celebrities.

The Baynes Soil Improver is willing and anxious to do its part in arousing the too modest ambition of some competent mind, and enthusing the energies of this capable person by the nobleness of the purpose and the magnitude of the benefits to humanity through the opening of this door.

The importance of maintaining and improving the fertility of the soil by feeding the proper fertilizing food to strengthen the productiveness of the growing crops, is causing the rally of a host of interests in the behalf of this vital branch of Agricultural industry.

This problem covering the foundation of the greatest industry to the people and the nation merits every effort from every source which can benefit the soils capacity for yielding.

The farmers need to be awakened to the urgent necessity of action and thought on the peril of neglecting this fertilizing question. This problem is one of the more we know, the more we see we need to know.

PRODUCE THE LARGEST YIELDS OF FARM OR GARDEN CROPS BY USING ONLY PURE BRED SEED

The farmer who has not practiced using pure selected seed from his own raising or from a reliable and responsible seed house is not aware of the amount of his loss in a season by not using pure selected seed.

There are efforts to increase yields made by farmers frequently where they have secured choice seed that was of such superior quality that it won their admiration and aroused their ambition to grow some of the kind on their farm. The results have been such that they have been so gratified and recompensed that it has been the means of causing their adoption of choice pure bred seed thereafter. The advantages and profit were so pronounced that it would have been a gross neglect of duty by failing to observe them.

We find a report in the Chicago Tribunte, September 9, 1923 that D. J. Murphy, Jefferson, Wisconsin, had sold the 400 bushels of Irish Cobbler potatoes grown upon one acre for $431.00 and the same was highly praised for their quality and yield.

The benefits from the use of pure bred seed of good quality has been established by the United States Agricultural Department and Agricultural Experiment Stations.

The U. S. Department of Agriculture has at a great cost made very extended tests both in numbers and in length of time of pure bred hogs compared with common hogs, for pork production. This was managed to obtain the facts. This careful test resulted in a profit of 38 per cent greater for the pure breds than the common hogs for pork purposes alone.

The pure bred selected seeds compared with the ordinary seeds used without care in selecting will in both yields and quality show as favorably as pure bred hogs.

The grain that grades at the top always commands a premium with the strongest demand, besides the larger increase in yield, which makes a double profit.

Poor seed is often infected with some disease and also is liable to carry some seeds of noxious weeds or plants, the introduction of which is difficult frequently to eradicate.

(Continued on page 9)

TO GIVE THE SOIL A FAIR SHOW INSURE YOUR NEXT YEAR'S CORN CROP

Field Selection

Field selection and proper storage of corn, as compared with other selection methods, will usually give an increased yield of from 2 to 3 bushels per acre and sometimes much more. This alone is worth while. An even more important reason for field selection is that it insures to the grower a sufficient supply of the best seed obtainable for his own farm regardless of prevailing weather conditions. The "seed corn crisis" which occurs in the corn belt every few years does not affect him. Field selection provides a means of securing mature seed from disease-free plants. By this method, seed is also secured from a known source. At the time of selection, a study can be made of the plant on which the ear grew and of its surroundings. Selecting seed corn from the crib or at husking time gives the grower no knowledge of the conditions under which the ear was produced. Since corn is readily modified by selection, this selection, in the field, of the desired type of plant is actually an efficient system of breeding, perhaps the only one which is practical on the average farm.

When to Select

Seed corn should be selected in the field when the kernels are glazed and well dented and when the inside husk is white and papery. This will usually be just before the corn is cut for the shock. Seed selected at this time can be dried before freezing weather. It is sometimes assumed that seed corn picked at this slightly immature stage is inferior to that which is allowed to ripen fully, but both, experiments and experience, show that this is not the case. Corn, picked even as early as the milk stage, will germinate perfectly, if carefully dried, and experiments have shown that seed picked at the denting stage will germinate at least as strongly as that left longer on the stalk. The average date of the first killing frost is October 10, in southern Ohio, and October 5, in central and northern Ohio. Usually, therefore, seed will be selected long before a killing frost. If, in an unusual season, corn is killed by an early frost, good seed can still be secured if selected from the field immediately after the frost. Contrary to the usual belief, the first frost very seldom injures the germination of the corn, even if it is not mature.

How to Select

A good method is to fasten a grain bag over the shoulder by means of a broad, padded strap. A hoop in the top of the bag saves time in gathering seed. Select from two rows at a time in the best part of the field, emptying the sack at the ends of the rows. Following definite rows in this manner prevents going over the same ground twice, as is likely to be the case with random selection. It is not necessary to examine every hill. The ideal type of plant should be fixed in the mind and only the ears on these plants examined. Raise the ear slightly and pull the husk down on the under side to examine the ear. Ears opened in this manner are less likely to be injured by birds or weather when left on the stalk.

What to Select

Select mature ears on vigorous, *green,* healthy stalks surrounded by a full stand of plants. Premature dying of the leaves is one of the most common indications of an unhealthy stalk, and yet such stalks are likely to be chosen in an attempt to select early maturing ears, if care is not exercised. A stalk which has produced a good ear in a normal stand is more likely to produce a strong seed ear than one which has had an unusually favorable opportunity. The ears should be borne at a convenient height for husking. Slightly drooping ears are desirable as they prevent the entrance of water inside the husk. Drooping ears have been definitely shown to mold less than upright ears. Select ears borne on a sound, strong shank of medium size and length. Broken shanks and down stalks are additional evidences of weak, unhealthy plants and should be avoided. Large well developed ears should be selected but not those which are too large to mature in a normal season in the locality. At husking time, or later, the very large late maturing ears are most likely to be selected, because of their size and good appearance but, in field selection, they ar easily seen and avoided, becaus they have not yet dented. Ear showing any evidence of mold o injury should not be selected. I is not possible to pay any grea attention to ear characters in th field. If the ear is mature, o good size, free from mold and th plant characters are satisfactory take it, leaving the study of th type of ear until winter.

Field Select:

(1) Mature ears.
(2) Ears free from mold.
(3) Ears borne on sound strong shanks.
(4) Ears from vigorous, green healthy plants.
(5) Ears grown at a convenient height from the ground.

How Much to Select

At least twice as much seed a is actually necessary for planting should be selected to allow fo injury and for the culling of undesirable ears before planting Any unused ears will be a reserve of seed corn, which is desirabl to allow for replanting and t furnish a supply for the next season in case of a seed corn shortage. From 12 to 20 ears, depending upon their size, are needed t plant an acre, so that from 25 t 50 ears should be selected fo each acre to be planted the following season. A man can fiel select and store from 5 to 7 bushels in a day.

Storing the Seed

Early selection alone is not sufficient to insure good seed corn It must be properly stored. Corn selected at the time here recommended will heat and hold in a few hours if left in sacks or piles All seed ears should be stored *the same day as harvested,* in a *dry well ventilated place,* and in such a manner that *no two ears touch*

Where to Store

A good storage room should be dry, capable of good ventilation by windows or a regular ventilation system. Artificial heat is desirable where it can be supplied. Examples of good places to store corn are special seed corn houses, granaries, tool sheds attics, or spare rooms in the house, furnace rooms—in short, any dry, well ventilated building Poor places sometimes used to

(Continued on page 22)

(Continued from page 7)

The SOIL IMPROVER is nxious to give the Soil all the ssistance to which it is justly entitled and it is to the farmers' enefit to secure it. "BAYNES' SOIL IMPROVER" proposes to work faithfully to advance the armers' interest.

The farmer who will adopt using pure seed once is sure to continue it as a valuable and profitable ractice worthy of the most acomplished farmer.

MAINTAINING FERTILITY

The following paragraph comes rom an article "Ground Limetone for Soil Improvement," by Dr. Robert Stewart of the Uniersity of Illinois.

Doctor Stewart quite wisely emphasizes the fact that neither lime nor fertilizer is a substitute one or the other; that where lime is needed we should not use more ertilizer to make up the difference, and where fertilizer is needed lime will not take its place.

"Of course, neither form of limestone material alone can maintain the productivity of the soil where no provision has been made for addition of phosphorus or the maintenance of the nitrogen supply of the soil. The Pennsylvania soil responds readily to nitrogen and phosphorus, and must therefore be deficient in these elements; where farm manure is added in addition to burnt lime the yield of crops is increased by about 75 per cent. Unfortunately ground limestone was not also used in these experiments in connection with farm manure, so that a further comparison of the value of the two forms of limestone materials is not possible. It must always be emphasized that limestone material alone cannot maintain the crop production power of the soil, unless the soil is already well supplied with the other necessary plantfoods."

REDUCE WHEAT LOSSES BY SOWING PURE SEED

The loss of thousands of dollars on the Pennsylvania wheat crop every year because of the presence of garlic and other noxious weed seeds could be largely prevented, says State Botanist E. M. Gress, by paying attention to the purity of the seed wheat which is sown.

Now is the time, according to Dr. Gress, to prepare the seed for fall sowing. Many farmers have been and still are careless about the kind and quality of the seed sown. The seed should be entirely free from noxious weed seeds, especially garlic and cockle since these are the two which exert most influence in lowering the market price. The discount on wheat containing garlic has been found to average about 12 cents a bushel, a tax paid for carelessness.

STARTLING BARGAINS FOR BREEDERS

For the readers of Baynes' Soil Improver we have aranged the series of offers below. These outclass, we believe, any offers of similar goods ever made before. Every article is one you need and is offered at a price you can not resist. We make these startling bargains in order to quickly establish ourselves with the readers of Soil Improver. All our products are of old standing and as you will see, we stand back of every one. Make out your order now for one or more. We do not expect to repeat these special offers. So do not delay. Breeders Supply Company, 431 South Dearborn St., Chicago, Ill.

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In order to introduce our poultry remedies quickly to readers of Baynes' Soil Improver we are making an extra special combination offer in connection with our

PROFIT-MAKER MITE KILLER

We guarantee that one thorough application of Profit-Maker Mite Killer, by brush or sprayer, to the interior walls, roosts, etc., after a previous cleaning, will exterminate mites and ice for a period of one year.

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We will send them prepaid.

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This famous remedy is guaranteed to stop and to prevent scours in 12 to 48 hours. Easily given in the feed. Used by many breeders regularly to stop and prevent scours. Acts as a perfect tonic. Keeps pigs and calves healthy and strong. They grow faster and get bigger.

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For 6 Lbs.

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This 6x8 loose leaf, leather bound and gold stamped book contains enough loose sheets to keep records of ten sows and their litters for five years.

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Write today for this book. Five days after receiving it send us $5.00 or return the book at our expense. Now's the time to bring your brood sow and litter records, pedigrees, sales and expense up-to-date. Send today.

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While They Last

We have a limited number of large aluminum sale tags that we offer in sets of 25 and 50 only at the unusual bargain prices of 50c and $1 respectively.

Now is the time to get your sale tags at a startlingly low cost. Sent prepaid upon receipt of stamps or money order. 25 for 50c, 50 for $1.00.

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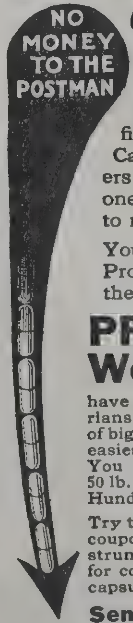
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You pay only when you see Profit-Maker Capsules produce the results we claim.

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BREEDERS SUPPLY COMPANY, Date..........
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Name..........

Address..........

The Pennsylvania Seed Law requires that all seeds sold in certain quantities for seeding purposes shall bear a tag or label giving information as to purity, germinating qualities and the nature and kind of impurities contained. —Penn. Dept. Agr. P. B.

DEVELOPMENT OF AMERICAN POTASH

By Chas. H. MacDowell

The danger of our agriculture and our chemical industry through dependence on an outside supply of potash was emphasized when the war started in 1914. Potash is a necessary element in crop production and in making important chemicals. Germany has monopolized potash production and, having a monopoly, exercised it. It was easier to buy than to make and there was no apparent reason why other countries should develop a source of supply, so the world took the easier way and has paid for it.

In 1909 American buyers broke the German monopoly for some hours and made large purchases. The German government broke these contracts. At this time study was made of the possibilities of obtaining potash here, and the Geological Survey and the Department of Agriculture made some investigations. Individuals also prospected for potash. In Germany, this element is found in veins running through rock salt deposits at depths ranging from 1,500 to 4,000 feet. No deposits of this character have been found in this country, so other sources have been utilized.

The water of certain lakes in Nebraska, Utah and California contains potash in solution, combined with other salts. The giant seaweed of the Pacific Coast is a source of supply. Sugar waste waters, molasses residues, wool scourings, wood ashes, certain rocks, such as feldspar, leucite and alunite, and other miscellaneous materials contain potash. It is from these sources that our American potash has been produced.

Potash in sea water and in lake brines has come from the weathering and breaking down of rocks containing this element. Rains have leached out the soluble potash and other salts and they have been transported by water to the ocean or to the lakes in drainage basins not connecting with the sea.

Potash to be commercially valuable must be water soluble. It must not contain impurities bad for crops or for certain crops. To obtain commercial potash from comples brines, evaporation, crystallization and partial purification is necessary. Many difficult chemical problems are invoked in obtaining a usable salt from some of the brines. Other lake waters simply require evaporation, but much water has to be driven off and this means heavy fuel consumption. In treating rocks containing potash, both heat and chemicals are needed to release the potash, as it is generally tied up with silica. Time, money, "know how" and courage are required to develop the proper methods and to build plants large enough to make any tonnage.

When it became apparent that the war would continue for some time, efforts were made to produce potash here, and 1916 found several ventures under way and producing. Your speaker was one of the early producers. In co-operation with several friends, a plant was built near Marysvale, Utah, to produce potash from a mineral called "alunite." The plant began to produce in the fall of 1915 and made a pure sulphate of potash. It continued operation until December 30, 1920. The product was superior to any other sulphate produced, and on account of its purity was of great value in solving some of our early war problems. A chemically pure carbonate of potash was made from it for the production of optical glass so that our boys could see as far as the Germans, who had a practical monopoly in making optical glass for range finders, field glasses, gun pointers, cameras, etc. By working twenty-four hours a day, a plant was built within three weeks by the Armour Company for the making of this potash, as against an original estimate of three months time to build. Intricate chemistry was involved in the process, as unusual purity was demanded. Permanganate of potash used in the first gas masks and other important chemicals was made from this sulphate.

Searles Lake, California, and the Nebraska lakes were early producers, the latter being the largest single source of supply. Plants were erected to recover potash from kelp (seaweed). Potash was recovered from dust from cement burning, from beet sugar waste waters and from molasses residues. Lake brines from Utah were also utilized. The shales of North Georgia and the green sands of New Jersey were used in a sma way as raw materials, and a larg amount of money was invested the erection of a plant in Wyomir to extract potash from the leuci rock.

There are abundant material some far away and some close consuming centers, but with th present strong competition betwee German and Alsatian potash pr ducers there is little hope of pr ducing any large part of America potash requirements at a profitabl basis. Beginning in 1920 the Unite States Potash Producers' Associa tion made a very strong effort get an import duty placed on po ash, but largely through the activit of the Farmers' Federation the bi was not passed.

The old potash fields of German were all east of the Rhine. A ne field, however, had been opened u in Alsace before the war, an seventeen mines were under co struction in that territory. Severa of them were actually producin Work of the unfinished develop ments was suspended with the be ginning of the war, but output wa maintained at the developed, pro ducing mines. Germany has los this field and, theoretically at leas the potash monopoly has bee broken. No doubt eventually th German and French producers wi find it to their interest to perfec a working agreement, but up date they have been unable to agre on a proper division of the expor trade, with a result that at th present time the potash prices ar considerably below pre-war basis.

I visited the Alsatian fields i May of 1919, in company wit French officials. At that time the were hoisting 2,500 tons a day o mine run potash containing abou 18 per cent pure potash, and wer making a small tonnage of concen trated muriate of potash, all equa to the best produced in Germany Much work will have to be done i the mines to get them in as goo shape as the fully developed Ger man properties, but a steadily in creasing tonnage will come out o France. A small amount of sul phate of potash is now being mad in Alsace, but most of the world' requirements of sulphate are com ing from Germany.

Power for hoisting, milling, etc. in Alsace comes from water powe developed along the Rhine. Th French government estimated i 1919 that within two years thi field would be hoisting 6,000 ton a day, and would be able to tak

re of the bulk of our require-
ents. This prediction has not been
tirely fulfilled, but the Alsatian
ines have steadily increased their
oduction since the war, and last
ar were able to take care of
arly 40 per cent of the require-
ents of the United States. The
tash is of good quality. I am
ite familiar with the German de-
sits, as I have visited a number
the mines in times past.

The embargo on the shipment of
tash from Germany was raised
July of 1919. Beginning the
ring of 1920 the Germans and
rench began active campaign for
e United States potash markets,
d shipments have increased until
ring the year 1922 a total of
er 200,000 tons of K_2O were im-
rted. The New York office of
e Alsatian Potash Company ad-
sed that the total production of
w salts extracted from the Alsa-
an mines during the year 1922
nounted to 3,300,000 metric tons.

The consumption of potash in
914 totaled 240,000 tons of pure
tash, in approximately 1,000,000
ns of material. In 1916 the
merican production totalled 9,720
ns; in 1917, 32,571 tons; in 1918,
4,561 tons; in 1919, 32,474 tons;
1920, 48,077 tons; in 1921, 10,-
71 tons; and in 1922, 11,714 tons.
n 1923 the only large domestic
perator of potash is the American
rona Corporation located at
earles Lake, California. Due to
e value of by-products extracted
the evaporation of the Searles
ake brine they are still competing with the foreign potash, and they will probably make during the year 1923 a total of 10,000 or 11,000 tons of K_2O.

WASTING THE SOIL

A professor speaking at the Annual meeting of the Kansas State Board of Agriculture four years ago with a view of enlightening his audience, stated: We have been wasting the soil.

Prof. Binder calculates $500,000,000 is lost every year by the soil being depleted and wasted—washed into the rivers—positively wasting our resources. I was in Palestine and saw those bleak hills. I wondered to myself how they could maintain the millions of people in the past. They could not even maintain thousands today. These hills and valleys are bare and bleak; nothing grows there. The soil is gone; you cannot raise anything. The people were discouraged. Very little can be grown except in a few small patches. If we continue to waste our land, where will we be in a hundred years?

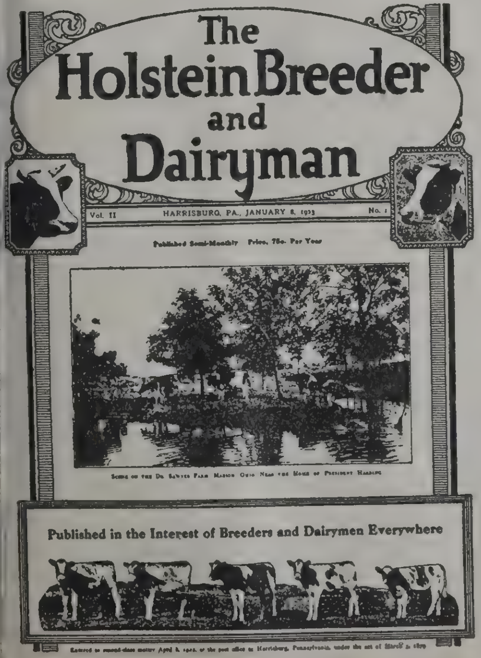
We must change. Some land in Germany has been farmed a thousand years, and today they grow ten times as much per acre as we do in this country.

It is possible to use land for a thousand years and leave it in better condition than it is now in this country.

Another farm lecturer states: "The American farmer and the American people ought to be alarmed at the decreasing fertility of the soil to the extent of 44 per cent. Figures are dull things, and we do not greatly enjoy statistical information. I want you to know that a large share of what the farmer has, was taken from the soil—the elements of fertility, that have not been replaced. A process of mining has been carried on, under the name of farming. Forty-four per cent of the virgin fertility of the soil exhausted. This must be changed by improved system of farming for our benefit and the succeeding generations.

PURE BRED GOOD SEED

The good quality and pure bred seed for big yields was demonstrated some years ago by Argyl Tilly, a young farmer in Harrison County, Missouri, who bought a bushel of prize winning seed corn, paying $62 for it. The neighbors all laughed at him and said he was foolish, had the corn mania. The results were he won $125 in premiums that year on corn grown from the high priced seed, and sold over 500 bushels of seed at $5 a bushel. His corn won first at the county show and the yield on the five acre plot shown was 115.1 bushels per acre. There were 50 entries in the five acre yield class, there were three over a hundred bushels an acre, two between 95 and 100 bushels and three between 90 and 95. The average of the yields of the 50 contestants on their five-acre plots were 80.1 bushels.
—Mo. Col. Agriculture Bulletin.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IN QUEST FOR NITROGEN FOR AGRICULTURAL USE

With the closing of each decade, some new discovery has been given the world, some new thought has been launched that has borne its fruits e'er Time went far on his journey again. It has been so in science and it is so in agriculture.

Men are ever seekers after truth. Their quest has been for it throughout all time, and in every direction. As a result of this quest, philosophy is the better, art is the better, government is the better, science is the better, law is the better, and all men are the better.

The quest of truth has gone on from the very beginning of time; it has led out in every imaginable direction. But the surprise of many is this: the postponement of the pursuit of the practical until recent periods in human progress. Especially has this been true of the practical arts, and of agriculture. And yet all the while the world has been dependent upon the soil for its bread, for its raiment, for its shelter; and back of these is the controlling influence of the nitrogen of the soil.

The quest of nitrogen is of comparatively recent times; but once its story learned and its truth established, the solution of its mystery becomes a most valuable contribution to crop production and to soil maintenance, as well as a most powerful force in a new agriculture.

Farming in a broad way, now, is being built upon the legumes; the tiller of the soil is becoming a legume farmer. This state of affairs has resulted in recent years only; in fact, since the publication in 1886 of the researches of Hellriegel and Wilfarth, who set forth with a great array of facts the way in which nitrogen is accumulated and fixed in the soil. While there were investigators before this time who through study and research had got an inkling of the true secret they could not find the key that unlocked it. Since the door was opened by these agricultural wealth-makers an abundance of evidence had accumulated, showing, without a shadow of doubt, the manner in which the stores of free nitrogen of the air are utilized in plant nutrition.

The free nitrogen of the air, you know is not available plant food. No agricultural plant of itself can secure this air element for its use—not a wee bit of it. Of course, many men, and some very learned men, at that, believed in the early days just the opposite, but they have been proven in the wrong, and at last the true solution of this knotty problem has been found, and solved in a way of the highest value to every man who manages land and employs the methods open to him, that his poor-yielding fields may be restored to power, and their fertility and that of others fully maintained in respect to nitrogen.

The Story of the Secret's discoveries.—To have the complete story of the fixation of nitrogen, we shall have to go back quite a way in history; back to the time when chemistry first appeared as an exact science; back to the time when it was believed that all plant substances came from the soil; we shall have to go back to these days in order to know the early theories of plant nutrition. Only the real guidemark theories will be introduced, that the development of the idea of nitrogen fixation in the soil and its uses by plants may be clearly understood.

The important guidemark theories are as follows:

1. That all plant-food elements come from the soil.
2. That nitrogen is secured by plants through the absorption of soluble organic substances.
3. That nitrogen is due wholly to the atmosphere: the Liebig "mineral theory."
4. That neither legumes nor cereals are able to "fix" the nitrogen of the air.
5. That leguminous plants get their nitrogen from the atmosphere and others do not.
6. That the soil, aided by microscopic vegetation, gathers free nitrogen from the air.
7. That bacteria in the root nodules are responsible for the fixation of nitrogen and the transfer of it to the plant.

The First Theory: All Elements Come From the Soil.—Until science was ready to devote itself, in a measure, at least, to some practical problem, like a study of soils, plants, or animals, progress could be slow only, and proof might be furnished, that should contain a grain of fact or evidences we consider such today suggestions would be of value, only, in that they occasionally worked in sympathy with the governing law, unknown in what manner or how, to the author, or to the disciple that followed and practiced his philosophy. Evidence in these cases were coincidences, only and of no further value.

The Second Theory: Plants Absorb Soluble Organic Substances.—The theory of absorption, in the light of knowledge on these subjects, had some reasonableness about it. This theory declared that only soluble organic substances were available as food plants; that as such substances were available as food for plants; that such plants secured their food; that organic substances furnished not only the nitrogen but all other substances as well. And to a certain extent these ideas were correct. The fault of this theory lay in its incompleteness. For the mineral supply of food was quite overlooked; only soluble organic matter influenced crops' growth. This view was held by some investigators—De Saussure particularly advocating it. It was overthrown, however, when Liebig proposed his mineral theory.

Liebig's Theory: So-called "Mineral Theory".—The author of this theory was the real beginner in chemistry, as applied to things agricultural. He worked with soils; he studied many agricultural plants; he devoted a great part of his useful life to many problems of plant nutrition. His theory held that only the ash or mineral substance used by plants is obtained from the soil; that the carbon, as well as the nitrogen, is secured by the plant from the atmosphere—the great storehouse of these materials. Liebig contended that when mineral substances are abundant, either through nature or through other supply, maximum yields will result, other things being provided, regardless of the quantity of potential nitrogen in the soil. He further claimed that if an abundance of the necessary minerals is present, the plant will be well able to take care of itself, and

its own efforts secure just as
ich nitrogen as is required from
nitrogen compounds of the
that are washed down in rain,
ow and hail, as is required for
ery need of the plant. For did
t the leguminous plants show
s? He thought so. If the
eals failed to do likewise in
ls apparently no worse, it was
ely because minerals were
esent insufficiently to supply
plant with its requirements;
d, because of this fact, there
eal plants were rendered some-
iat impotent in their ability to
t what nitrogen they needed.
is mineral theory simply meant
s: put minerals into the soil,
d the plant will be strong and
gorous, and quite able to secure
nitrogen, irrespective of the
pply of the soil.

**The Theory of Non-Fixation:
Plants "Fix" Atmospheric Ni-
ogen.** — Boussingault already
d shown, even before Liebig
d formulated and promulgated
mineral theory, that there
ere considerable differences be-
een yields of certain groups of
ants, and especially that there
ere noticeable differences in the
rogen obtained, when cereals
d leguminous crops were
own. He had ascertained, also,
at when leguminous crops were
roduced, either before or after
reals in any plan of rotation, a
eater quantity of nitrogen was
cured during the growth of the
guminous crop than during the
owth of any cereal crop, and
is was the case when additional
anure was supplied.

Liebig was led at this time to
vise the theory he had main-
ned heretofore, by declaring
at cereals of all kinds must se-
re their nitrogen from the soils
from some supplied fertilizer
ntaining this element.

At this stage of investigation
her workers came into the field,
table among them were Lawes
d Gilbert in England. These
en carried experiments quite
nilar in nature to those of Bous-
ngault, and which seemed to
ow that the only source of ni-
ogen supply is from the soil; in
her words, that no cultivated
ant is able either to secure free
togen of the air, or to establish
in the soil for future use. It is
le to secure it only as it does
ineral elements: from the com-
ounds of the soil, or from fertilizing compounds supplied with the soil.

The Concluding Theory: The Secret of the Root Tubercle.— This entire mystery was cleared at last by Hellriegel and Wilfarth, who found, by their investigations, that certain plants, like cereals and grasses within limits, grow in proportion to the amount of plant food supplied—including nitrogen. If an abundance of mineral elements and nitrogen was supplied the soil, there was secured always a most bountiful harvest; if, on the other hand, nitrogen, for instance, was withheld, a feeble growth, only, resulted if, indeed, a lingering death did not actually take place.

With the legumes—clover, lupines, peas, beans, etc.—a different behavior was observed. Instead of dying, when the nitrogen content was consumed, these plants recovered, very rapidly, indeed, and until maturity maintained a most luxurious growth. And this condition prevailed despite the fact that no nitrogen compound of any sort was given the plants or added to the soil, either before planting or during any stage of growth.

These observers noticed a peculiarity—the key of the secret—that others, also, doubtless, had observed, but who failed to connect the same to the theory of plant feeding and plant growth. The peculiarity which they included in their studies was the characteristic growths or nodules that persistently associated themselves with the roots of every leguminous plant.

A final proof of the theory was secured in this way: They used sand that had been made sterile in every way: all organic matter was destroyed, and, of course, every kind of microscopic vegetation was killed—no bacterium of any kind was present in the soil. Some legume seeds were now planted. Just as soon as the nitrogen of the seed was exhausted, starvation manifested itself, and the plants began their decline. At this point, a water extract prepared from untreated soil—just ordinary garden soil—was added, but only a small quantity was used. In a very short time these starving plants began their improvement; they recovered their wholesome, natural color, assumed a vigorous, lusty growth, and reached full development,

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Practically every farmer in your territory is beginning to appreciate the value of Agricultural Gypsum in obtaining a heavy growth of clover, as indicated on the left side of this picture. Agricultural Gypsum is also worth many times its cost as a preserver of nitrogen in manure. You have a fine opportunity to sell Agricultural Gypsum at a good profit. Write us for full details and also for a copy of our free illustrated book.

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with no suggestion from that time on that any struggle or hardship had ever been a part of their existence.

Of course, the succor which came at the opportune time was none other than the friendly water solution that contained the germs fitted by nature to gather nitrogen from the wandering air in the soil, and to transfer it to the starving plants.

Experiments, variously planned and prosecuted, were from now on in order. They served only to verify the concluding theory. The secret, at last, was learned, the mystery penetrated, and a new idea given the world. A wonderful achievement it was! And immeasurable in its results!

Has any statesman ever constructed a theory so useful? Has any politician ever devised a policy so far-reaching in its results? Has any soldier, with legions behind him, ever won so glorious a conquest?

Modestly, unassuming, and painstakingly, these men have labored and have left to the world a legacy of untold worth, of unequaled largeness, and of most lasting endurance: one that shall be shared by all men alike, whether they be old or young, rich or poor, learned or unlearned. So long as men plow and sow, so long as men need bread and meat, so long as nations live and survive, so long shall the names of Liebig, of Boussingault, of Lawes and Gilbert, of Hellriegel and Wilfarth be honored and esteemed and glorified as world benefactors and as beacon lights of the human race.

SOILS, a 300 page book by C. W. Burkett; Orange Judd Publishing Company, 15 East 26th Street, New York, N. Y., as publishers, also of Standard Agricultural Books.

WORTH OF A GOOD NAME

"A good name in man or woman is the immediate jewell of their souls."—Shakespeare.

A farmer whose position is such in many cases that the party he is dealing with has to depend wholly upon the honesty and truthfulness of the farmer's representations, makes it necessary for straightforward, square dealing by the farmer to establish a good reputation and maintain it.

"Do unto others as you would like to have others do unto you," is deemed a just scale upon which to weigh your transactions.

LINCOLN'S IDEAL FARMING

The great President, Abraham Lincoln, who was born and reared a farmer's boy, elevated himself by his inherent qualities, through his persistent efforts, to be the country's greatest statesman. After being elected for his second term as president of the United States he was assassinated while president. Born in a cabin and died in the White House, admired, loved and mourned by 99 per cent of the people for his goodness and greatness. Here is his opinion:

"No other occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture.

"I know nothing so pleasant to the mind as the discovery of anything that is at once new and valuable—nothing that so lightens and sweetens toil as the hopeful pursuit of such discovery. And how vast and varied a field is agriculture for such discovery! The mind already trained to thought in the country school, or high school, cannot fail to find there an exhaustive source of enjoyment. Every blade of grass is a study; and to produce two where there was but one is both a profit and a pleasure.

"And not grass alone, but soil, seeds and seasons—hedges, ditches and fences—draining, droughts and irrigation — plowing, hoeing and harrowing—reaping, mowing and threshing—saving crops, pests of crops, diseases of crops, and what will prevent or cure them—implements, utensils and machines, their relative merits and how to improve them—hogs, horses and cattle—sheep, goats and poultry—trees, shrubs, fruits, plants and flowers—the thousand things of which these are specimens—each a world of study within itself."

QUALITY IN SOIL GIVES QUALITY IN CROP

Wheat grown in Kansas is notably hard, glutinous, high in protein, and of good milling quality. The same wheat taken to California will produce soft, starchy kernels low in protein and of poor milling quality. This difference is probably the result of different soil conditions brought about by variations in climate. As evidence for this belief it has bee shown that wheat of good qualit can be produced on California soil by the addition of nitrates at certain periods during the growth o the crop that these same soils whe removed to the State of Kansa will produce high quality whea without treatment. Differences o quality in the same crop arisin from differences in soil condition may be as extreme as those between entirely different crops. A interesting example is cited of tw pasture fields in the Romne Marsh in England which to all outward appearances were similar a to the kind of soil and the relativ abundance of the various grasses yet it was possible to fatten a stee on one pasture without any grai while the best that the other coul do was to keep young stock i growing condition. This difference was traced to a lack of available phosphoric acid and nitroge in the soil of the latter pastur Similar differences in the fattenin qualities of bluegrass pastures hav been observed to exist in this country between those on soils of limestone origin and soils of sandston and shale origin. In the limeston areas of Virginia, West Virgini and Kentucky the feeding qualit of the blue grass is so high that steer can be made to satisfy th exacting requirements of the export trade without feeding an grain. A chemical analysis of th bluegrass from southwestern Virginia showed one-third more protein than is commonly found i bluegrass from non-limeston areas.

Feeding the Animal Throug the Soil.—Improvement in so fertility often returns as muc through increased quality of cro as through increased yield. A striking instance comes fro England. Two fields were seede alike to grass, one being unfertilized, the other fertilized wit 100 pounds of muriate of potas and 700 pounds of basic sla phosphate per acre. The latte product supplies both lime an phosphoric acid. The fertilize field not only yielded one-thir more grass than the unfertilize field but the cured hay was foun by actual feeding trial to hav been increased in feeding valu from $25 to $31 a ton by th treatment. It is interesting t note that on a third field whic was fertilized with a nitrogenou fertilizer only, the total yield wa increased one-half but the feed

value of the hay was actually
creased to $22.80 a ton, a de-
ase probably related to the
mulation of the non-legumes
the expense of the clovers.

Fertilizing for Quality.—The
narkable effect which applica-
ns of lime and phosphates
en have on the flora and hence
feeding value of a pasture is
ll shown by the change in
getation of some grass plots at
Pennsylvania Station. Start-
with a sod containing only a
v scattered clover plants it was
ınd that at the end of 6 years'
tilization with acid phosphate
per cent of the pasture was
ite clover and 12 per cent red
ver. On a similar plot fertil-
d with nitrate of soda the
ver had entirely disappeared.
ten marked improvement in
composition of a crop is ef-
ted by the use of limestone or
tilizers. Cases are on record
ere the protein content of a
p has been doubled on fertil-
d land. Similar increases have
en observed in the phosphoric
d content of oats as a result of
plications of acid phosphate.
trogenous fertilizers quite gen-
lly increase the protein con-
t of non-legumes such as
eat or timothy, although when
plied to legumes they some-
nes produce the opposite effect.
tash fertilization has not been
und to have any significant ef-
ct on the quality of our com-
n crops. There is good rea-
n to believe that a more gen-
al use of limestone and phos-
ate fertilizers would prove of
cided benefit to dairying and
ck raising in those parts of
hio where the soils are deficient
these constituents. — Dept.
ils Ohio State Uni.

EEPING UP FERTILITY WITH HOGS.

(From A Contributor.)

Keeping up the fertility of the
rm is the first duty of the hus-
ndman. No man has a right
waste the God-given inherit-
ce. The penalty for wasteful-
ss is not so speedily visited
on the violator of natural law
usually comes to the violator
written law, and this may be
e reason why we have so many
il butchers. The study of soil
d how to conserve and improve
has become a vital question,
en in this new west. Already
we see fertile fields robbed of their virgin wealth, and posterity is recklessly wronged of its inheritance. By corn and hogs this stored up fertility of ages has not been wasted as rapidly or as recklessly as by wheat and cotton, still the practice of feeding back the corn on the farm, while good so far as it goes, has so many defects that we know of many districts where corn and hogs have long been the main crops, and show a marked decline in ability to produce regularly the great crops they were noted for twenty-five years ago.

The theory of returning to the farm the manure possible to be made from the crops grown, ought to have more consideration by most of us. The theory has much of value—but in the common practice the theory breaks down, not because of its defects but because it is not fairly and persistently practiced.

So long as the hog does not assimilate more than fifteen per cent of the grain he consumes to form his frame and upholster it with flesh and fat, we ought to have returning to the farm eighty-five per cent of the fertility taken from the soil to produce the crop. As the finished porker leaves the farm he carries beyond its reach, thus, fifteen pounds of every hundred of the elements stored in the grain and grass he has consumed.

A little planning in building feeding floors, where the manure can be saved, or at least not washed away, or in feeding awhile on the thinnest land and then changing the feeding places as the conditions of the soil demand, will conserve the most of the eighty-five per cent of corn and mill feed given to the hogs. More can be saved by feeding on a clover sod or even a blue grass, or old timothy sod than by feeding on bare ground, since the living plants assimilate quickly soluble portions of the excrement and urine from the herd. This judicious selection of feeding places so the droppings may not be washed away, saves not only the fertilizing values of the feed consumed, but distributes it and saves the labor of gathering, hauling and spreading. But there is on the average hog farm that big house, the pride of the boss, in which he can house his big drove of brood sows and their

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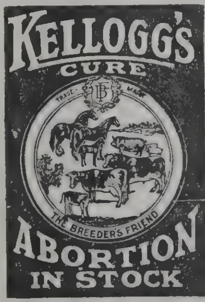

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pigs. This may be on a hillside or beside a creek, that he may not have the trouble of drawing water or hauling away the manure. For years the cobs and manure gather and fertility leaches away and into the lots about the hog house, the majority of this wealth of fertility wasted in defiling the premises and making them a center for outbreaks of filth diseases. For health's sake, and for wealth's sake, we need to reform. This waste of fertility is unreasonable, thoughtless and often criminal. It is the result of ignorance as to its value and of the common laws of sanitation.

Where so much wealth is wasted through ignorance or carelessness there is yet work for the apostles of progress in the corn belt.

As the soil has lost this much and all we waste of the eighty-five per cent, how are we to handle the soil and the hogs to keep the soil from gradually declining in productiveness?

Granting that it is possible to keep up the fertility of the soil by returning to it all the manure made on the farm, which is not true, then we come short, when our method of handling hogs and grain fails to save all manure, and return it to the fields, in such time and manner that it can be held in store in the soil and later taken up by the crops. How many of us do this? The man who feeds his drove on the banks of a stream, or hillside, so that the feeding place may keep clean, by gravity and the washing of rains, certainly has no conception of the value of hog manure, or the theory of returning faithfully and honestly to mother earth the riches he took to make fat his hogs. There are millions of dollars' worth of fertilizers washed away along the creeks and water courses, where hogs are fed, to be handy to water and to be kept out of the mud and filth incident to the average feed lot. Is this waste necessary? Can it be avoided? There are men who have never thought of this; there are others who do not care, as their aim is to get the hogs to market at least cost of labor and pocket the cash and let posterity look out for itself, as he has always done.

There is health and wealth in keeping the herd in the clover-field more and in the hog house and feed lots fewer days in the year. One of the readiest ways to improve our farms is to have more acres of grazing land for hogs on legumes clover and alfalfa and fewer acres of corn but no fewer bushels. It means improvement of soil and herd.

P. C. H.

MACHINES TAKE THE PLACE OF LACK OF HIRED MEN ON THE FARM

More and better farm machinery may help solve the problem presented by the present scarcity of farm labor, according to F. W. Duffee, of the Agricultural Engineering Department of the Wisconsin College of Agriculture.

One piece of farm machinery which Mr. Duffee believes may do much to enable the farmer to spend more hours afield is the light farm truck. Medium-sized trucks will make possible necessary delivery and other trips to town after the day's work is done in the field. They will make possible a great deal of the usual hauling of the farm by the farm women and boys, while the teams remain in the field. Many farmers are buying such trucks throughout the central states at present. Better haying machinery, side delivery rakes, loaders and stacking equipment may speed up the haying with less help.—University of Wisconsin, P. B.

NAPOLEON'S GREATEST SPEECH

Napoleon, who strode the earth in his day like a Colossus, a man of gigantic intellect, however worthless and depraved in moral sense, in his talk one day, as was his custom, at St. Helena, said: "I think I understand something of human nature. Of all the great men of antiquity, there was no one to be compared with Christ, who far surpassed them all. I tell you, all these heroes were men, as I am a man, but not one is like Him; Jesus Christ was more than man. Alexander, Ceasar, Charlemange and myself founded great empires; but upon what did the creations of our genius depend? Upon force. Jesus alone founded His empi upon love, and to this very da millions would die for him.

"The Gospel is no mere boo but a living creature, with vigor, a power, which conque all that opposes it. Here lies th Book of Books upon the tab (touching it reverently); I c not tire of reading it, and do daily with equal pleasure. Th soul, charmed with the beauty the Gospel, is no longer its own God possesses it entirely; He d rects its thoughts and facultie it is His. What a proof of th divinity of Jesus Christ! Yet this absolute sovereignty, He ha but one aim—the spiritual pe fection of the individual, the pu ification of his conscience, h union with what is true, the sa vation of his soul. Men wond at the conquest of Alexander, bu here is a Conqueror who draw men to Himself, for their highe good; Who unites to Himself, in corporates into Himself, not nation, but the whole huma race!"

A BIG INVESTMENT

Every farmer who does no possess Profs. Henry and Morr son "Feeds and Feeding," shoul secure a copy of the 25th Ann versary Edition of their 770-pag book, fully illustrated with phot graphs of live stock, scenes, et It advises the feed to all kind of live stock; horses, cattle, dair cows, calves, sheep, hogs fo growing and developing, th brood sow and fattening hogs.

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PROGRESSIVE FARMER

We are asked, who is a pro gressive farmer? We find tha Webster defines the word, "mov ing forward; improving. 2, tend ing to or favoring progress.

The farmer who is energetic aggressive, enterprising, movin forward, adopting the best prove methods in his farming opera tions. He should have in hi herds of live stock pure breds. In his dairy herds should be goo kers and butter producers. He uld have a knowledge of their ual product. He should like- e be posted on all points rela- to the cost of producing ps from the various pure bred d, and keep up the fertility of soil by feeding it to produce t crops and add some to the ility surplus each year. His r's business should finish up cessful and profitable and he be eader of BAYNES' SOIL IM- OVER. We would brand such gressive.

NURE FROM BEDDED ANIMALS IS RICHER IN NITROGEN

Vhen not too valuable, oat w makes an excellent bed- g material, as it is a good ab- bent for the liquid manure and es a higher percentage of ni- gen than wheat straw or al- st any other bedding material. ing to the increased value of w for roughage, it is not al- ys desirable to use it as bed- g. The only excuse, however, not using it in this way, says University of Missouri Col- of Agriculture, is that it shall fed on the farm where pro- ed. It is rarely good practice sell straw from the farm. It worth more when fed or used bedding and as an absorbent the liquid manure. Every r hundreds of straw stacks in ssouri are allowed to rot in the d and lose much of their or- ic material, while still others burned with the loss of both anic matter and nitrogen.

Vhen straw is not available, er materials may be substi- ed for the purpose of absorb- the liquid manure. Sawdust, vings, leaves, or other coarse anic material may be used. mers as a rule use too little lding. Bedding not only af- ds comfort for the animals but the easiest and most practical ans of conserving liquid ma- e. All straw or other coarse terials which cannot be fed uld be worked through the ns and returned to the soil as nure. Substances of this sort not decay as rapidly as the nure itself and therefore tend keep up the organic matter tent of the soil, afterward re- sing their own plant food ough slow decay.—Mo. Agr.

VALUE MISSOURI SOIL

The Agricultural Department of the State of Missouri has made extensive surveys of the soil of their state for the benefit of their farmers. In platting the different kinds of soil they collect samples of each type and send them to the College of Agriculture for chemical analysis. These give an index of the total amount and relative distribution of the plant food stored in the soils.

The land area of Missouri is 43,985,280 acres. The seven inches of surface soil for the acreage of the state contains notrogen valued a couple of years ago at over forty billion dollars, the phosphorus at four billions, and the potash at over two hundred billion of dollars.

This shows the invisible capital stock and surplus of the farms of the state. The farmers should maintain this for their own benefit as well as for the coming generation. The farmers are coming into their own through the wise course being pursued by their Agricultural Department "BAYNES' SOIL IMPROVER" is desirous of extending a helping hand in the work in behalf of the farmers.

LIME DOUBLES YIELDS FOR MANY FARMERS

Many Wisconsin farmers are going to increase their crop yields by the application of lime this spring, according to the soils department of the University of Wisconsin. This increased yield will be largest on the lighter acid soils where previous returns have been very small.

Several reasons may be given for liming, but there are three main reasons:

1. Lime corrects the acidity in sour soils and permits the growth of legumes.
2. It makes phosphorus and potassium (two important plant foods) more available.
3. It improves the physical conditions of the soil.

Finely ground limestone is a most satisfactory form of application and usually about two tons to the acre are applied. The average cost of such material is $2.50 a ton delivered at the station in carload lots. This cost will vary with the distance of shipment. The cost and labor of application will seem small, if one considers that at least five succeeding crops will be benefited by the initial application.

"Our civilization rests at bottom on the wholesomeness, the attractiveness and the completeness as well as the prosperity of life in the country."—Roosevelt.

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TO STUDY IRRIGATION

President O. E. Bradfute of the American Farm Bureau Federation has been invited by Dr. Hubert Work, Secretary of the Interior, to serve on a fact-finding commission to study the whole range of governmental methods in reclaiming arid and semi-arid lands by irrigation. In addition to President Bradfute the following have been invited to serve on the fact-finding commission: Julius Barnes, president of the United States Chamber of Commerce; James Garfield, Cleveland, Ohio, former Secretary of the Interior; Elwood Mead, Berkeley, Cal., irrigation and reclamation engineer; former Governor Thomas E. Campbell of Arizona; David W. Davis, of Idaho, reclamation commissioner, and Dr. John Widtsoe, Salt Lake City, Utah.

FARM BUREAU RADIO SERVICE LAUNCHED

In the inaugural address of the Farm Bureau Radio Service, President Bradfute said:

"If I remember correctly, the first message which ticked out over the S. F. B. Morse's first telegraph line was this: 'What hath God wrought?'

"I stand here tonight in a high room in the city which is the capital of the world's agriculture; and inaugurate a great radio service by which the farmer's voice takes to the air. I speak as president of the farmer's largest organization.

"Farm people and city people put little thing-a-ma-jigs to their ears or turn on a big tin horn and hear my voice. Without wires! Without code! A farmer's voice rides the unseen waves of the ether. It is appalling, wonderful, forcing to reverence.

"Well may we pause now and say, 'What hath God wrought?'

"The farmer who lives out on a farm somewhat isolated from his neighbors and without very frequent contact with others, necessary becomes an individualist. Such an one rather hesitates to give voice to his opinion on public affairs in the presence of others, and when he does so voice his opinion, the public rather hesitates to accept it as anything worth while, because he speaks only from the individual standpoint. Such a life, however, enables the farmer to do much reading and thinking. He becomes a close observer of the printed thoughts of other groups. As he observes how other groups became organized and were by that means enabled to add great weight to their opinions as expressed in an organized capacity, he, too, began to plan an organization by means of which he might speak through representatives chosen from among his own associates."

COMMITTEE STUDY FARM ELECTRIFICATION

Will Direct Development Work Along Sound Economic and Engineering Lines

The movement to stimulate a complete investigation of the application of electricity to farming was brought to a definite working basis at a meeting held in the office of the American Farm Bureau Federation, in Chicago, September 11.

At this conference final approval was given to the formation of the "Committee on the Relation of Electricity to Agriculture." This committee is composed of O. E. Bradfute, J. W. Coverdale, H. W. Moorhouse representing the American Farm Bureau Federation; Marshall E. Sampsell, G. C. Neff, J. C. Martin, Arthur Huntington, representing the National Electric Light Association; S. C. Cosgrove, representing the manufacturers of Farm Electric Plants; Prof. J. S. Davidson, representing the American Society of Agricultural Engineers, and S. H. McCrory, representing U. S. Department of Agriculture.

E. A. White has been employed as Director to devote his full time to developing the work of Committee. Mr. White will be officed in the headquarters of the American Farm Bureau Federation in Chicago.

The formation of this Committee brings together various groups vitally interested in rural elect fication and marks the first ti in American history when t farmer through his own represe tatives has actively participat in solving problems to be met taking a new form of power or the farm.

Reports show that approxima ly four hundred thousand far have electric service. This in cates that electrical service is n available on less than seven p cent of the farms in the nati

The new Committee will deavor to direct developme work along sound, economic a engineering lines. It is a n form of co-operative moveme and illustrates the possibilit when industries are properly ganized.

CO-OPERATIVE MARKETING

1. Rendered direct assistan in national or state marketing projects in twenty-one stat Made co-operative marketing t leading Farm Bureau project the year. Placed a national ma keting expert in charge.

2. Helped the states secu adequate and uniform co-oper tive marketing laws, supplemen ing the federal act on co-op ative marketing. Secured for t co-operative marketing depa ment of the American Farm B reau Federation and its affiliat state marketing groups the ser ices of an outstanding legal a visor of national reputation that co-operative marketing ass ciations might be built upon lin safeguarded by the laws of t land.

3. Fostered co-operative ma keting of livestock through t National Livestock Produce Association, which has added s new terminal markets during t year, until now twelve such c operative terminals are in oper tion with several more in immed ate prospect. These co-operati livestock terminals which we operating during the first fi months of this year have done total business of 20,719 cars livestock, with a value of $37,00 000. The average business ha

d by the co-operatives on these
rkets has already reached 9.6
cent of the total sales of these
rkets. Patronage dividends re-
ded to shippers during first
hteen months, $170,000. Now
ving membership of 100,000
stock producers.

Through a specialist in co-
rative dairy marketing aided
setting up or assisting strug-
ıg co-operative marketing
ociations in butter, cheese,
k, cream, condensed milk and
er dairy products in twelve
tes and through the Committee
Nine laid the foundation for a
tional Co-operative Dairy Sales
ency.

Backed up the Federated
iit and Vegetable Growers,
., the national growers' sales
anization for fruits and vege-
les, bringing into its circle,
te and local associations giving
national organization 21,000
wer members with a probable
ual tonnage of 50,000 cars.

. Developed a national plan
marketing potatoes on a com-
dity basis and presented or-
ization plans and actively par-
pated in campaigns in eight
tes.

. Developed a national plan
marketing onions on a com-
dity basis and furnished or-
ization plan for onion growing
es. Participated in organizing
iana Farm Bureau Onion
wers' Exchange, the first state
t of the national plan.

. Further strengthened the
nbership in the co-operative
acco marketing organizations
il the growers of this farm crop
v have one of the most effec-
co-operative marketing agen-
in the world.

. Called a National Egg Mar-
ing Conference at Chicago, ap-
nted National Egg Marketing
nmittee representing all parts
he country, and perfected pre-
inary plans leading toward na-
ıal co-operative marketing of
s and poultry products.

0. Throughout the south
her aided the American Cot-
Growers' Exchange until it
v embraces twelve cotton pro-
ing states with approximately
,000 member growers, with re-
ant market conditions most
orable to the cotton grower.

1. Urged farm or local stor-
of 200,000,000 bushels of
eat in the interest of orderly
rketing of this product. Op-
ed government price fixing of wheat and other farm products. Gave initial suggestions to the idea of feeding cheap wheat to livestock.

12. Helped secure a cut of $1,000,000 in the farmer's freight bill through favorable ruling from the Interstate Commerce Commission on mixed cars of livestock—a fight waged since 1920. Saving averages $3 to $5 per car for the farmer.

13. Participated in the reduction of the minimum weight on hogs in single deck cars from 17,000 to 16,000 pounds in ten principal shipping states and also helped to secure the establishment of a 16,000-pound car minimum on hogs throughout the Southeastern states. These accomplishments prevent serious losses due to overcrowding, and benefit the farmer in such reduced losses and in reduced rates to approximately $400,000 a year.

14. Used influence to secure needed appropriations for the U. S. Department of Agriculture.

15. Urged development of Muscle Shoals as a possible source of cheaper electric power and fertilizers for farmers.

16. Urged inclusion in the tariff law of a flexible tariff provision, thereby beginning a scientific, economic and non-political tariff system.

17. Worked for the butter standards law which passed Congress and established an 80 per cent butter standard.

18. Stood for the passage of the new Capper-Tincher Act placing grain exchanges under the supervision of the U. S. Department of Agriculture for the prevention of injurious speculation in cereal food products. Won in the fight for admission of farmers' co-operative organizations to membership in grain exchanges. Legality of act fully upheld by Supreme Court.

19. Fought for the law passed by Congress prohibiting the Interstate shipment of filled milk, thereby helping protect the dairy industry against adulterations of milk products with inferior vegetable oil compounds.

20. Helped to secure the passage of a law by Congress limiting immigration to 3 per cent of the foreign-born recorded in the 1920 census, thereby barring hundreds of thousands of undesirable aliens. Conducted farm labor supply survey throughout the states.

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21. Through a Department of Information made the farmer's voice articulate in the nation. Established truth - in - publicity policy.

22. Instituted a radio service, broadcasting regularly by wireless the latest agricultural news and views of the day.

23. Prepared a Farm Bureau Speakers' Bureau through which well posted speakers on agriculture are being furnished to state and county Farm Bureaus and others.

24. Published the first volume of the Farm Bureau Bookshelf under the title of "Co-operative Marketing" and sold it to farmers at $1.00 a copy.

A BRIGHT LIGHT AHEAD

Gray Silver, Washington representative of the American Farm Bureau Federation States: "By using machinery, farmers in this country have multiplied man power many times, enabling them to produce products in direct competition with coolie labor of the orient and peasants of Europe, maintaining at all times the high American standard of living. The farmer of today and the future will be the best risks bankers can find in making loans." Silver's predictions for the farmer's near future are golden, he expects to make good.

FARMERS' CO-OPS EXEMPTED FROM INCOME TAXES.

A new treasury decision of importance to farmers and farmers' co-operative societies was received yesterday in the office of Mrs. Mabel G. Reinecke, collector of internal revenue for the northern district of Illinois. The decision exempts all such farmers' associations from the income tax.

"Co-operative associations, acting as sales agents for farmers, fruit growers, live stock growers, dairymen, etc.," the decision reads, "or engaged in marketing farm products and turning back to the producers the proceeds of the sales of their products, less the necessary operating expense, on the basis of produce furnished by them, are exempt from income tax and shall not be required to file returns.

"In every case the association will be required to show that the ownership of the capital stock has been restricted as far as possible to actual producers, and that the association has not voluntarily sold or issued stock to non-producers. Co-operative associations organized and operated as purchasing agents for farmers are also exempt."

LESSON 4

(Continued from page 4)

work. They must have the right temperature—that of summer is the best for most of them. They must have a certain amount of moisture. When the soil is very dry, they can do but little work. Many of the most useful forms must have a certain amount of air. For this reason the soil should not be so wet and clogged up with water or even so very hard and compast that but little air can get in. They must all have food. Most of them live largely on the organic matter in the soil. This is one very great advantage in having plenty of organic matter in the soil.

6. The farmer can do many things to help the work of these small forms in the soil. Plowing and working the land, by loosening up the soil and thus helping the air to get in, helping to keep it moist, and helping to regulate the temperature, does much good. This is the main reason why it pays to plow the land some time before planting the crop and to work it several times between plowing and planting. In this loose, moist soil the bacteria work very rapidly and soon accumulate quite a supply of available plant food which the crop can use when it begins to grow. In olden times, farmers often worked the land this way one whole year without growing any crop of any kind, thus permitting the bacteria to get together a large supply of available plant food for the crop in the following year. We do not do this now because in the heavy fall and winter rains much of this soluble plant food is washed or leached down through the soil and is lost.

7. One of the best ways in which the farmer can help the work of the small life forms in this soil is by keeping plenty of organic matter in the soil. The organic matter helps to keep the soil loose, helps to hold moisture and furnishes the main food for the bacteria. The farmer can
organic matter in the soil by
ting back on the land cornsta
wheat straw, all the manure m
and, unless there is much man
an entire growth occasionally
such a crop as clover or cowpea

8. Sometimes cornstalks, w
straw and the like are burned
farms. This should never be
unless in extreme necessity, s
the burning destroys all the
ganic matter and wastes the n
gen. Organic matter is a very
portant thing in the fertility
soils and the farmer should
hard to add to the supply in e
way possible.

9. But in speaking so highl
organic matter. we should
clearly in mind just what it
and does not do. With the ex
tion of the nitrogen in legumes,
addition to soils of the organic
ter grown on them does not incr
their total supply of plant food,
cause all the plant food adde
this way was taken from the
in the first place. What the
ganic matter does do is to incr
very much the amount of
food becoming available in
It does this both by serving
food for the bacteria in the
and also because it in itself
tains considerable plant food
table in Lesson 3) which beco
available quite rapidly in the

10. In the main, this expl
why the turning under of veg
ble material grown on the land
creases the size of a succes
crop that can be grown, though
increasing the total supply of p
food in the soil. It explains,
example, why a larger crop ca
grown after a crop of weeds
been turned under than if the
had simply lain hard and bare
fore—the weeds increasing
available supply of plant
though not the total. (If the gro
of weeds contained wild legu
of course these would add n
gen.) Let us remember that,
the important exception of
nitrogen added in legumes,
plowing under of any kind of
ganic matter which has grown
the land increases only the a
able supply of plant food in
soil. (To be sure the additio
organic matter grown somew
else, or of the manure made f
it, does increase the total suppl
plant food in a soil but only
taking it from the other s
However, this does not lessen
importance of organic matter

ils. A soil without organic mat-
: would not grow good crops
en though it should contain large
iounts of all the plant foods, be-
use the plant food would not be-
me available for crop use.

11. We should also remember
at organic matter further helps
ils by keeping them open and
ose and mellow and by helping
make them easy to work, and
ially that it adds very much to
e power of a soil to store up
rge amounts of moisture from
ins for the use of crops during
ir weather.

12. The amount of available
ant food determines the size of
op that can be grown. Very
early the farmer should do all he
n to have enough present to
ow good crops. He can help the
il plant food to become available
good plowing, six to eight
ches deep, by good cultivation
id, above all, by keeping plenty
organic matter in the soil.
'here there are large supplies of
the plant foods in the soil, all
e farmer has to do toward feed-
g his crop is to help make these
ant foods available, but when the
pply of any one or more is small,
must not only do this but he
ust also in some way actually in-
ease the supply of these limited
ant foods in the soil. We have
arned that there are two plant
ods which are actually small in
nount in very many Kentucky
ils. These are nitrogen and
osphorus. It is just as much a
irt of good farming to add these
ant foods to such soils, so that
e crops may get the plant food
ey need, as it is to plow the
ound or cultivate the crop, and
such soils large crops can be
oduced in no other way.

QUESTIONS FOR STUDY:
ow does plant food in the soil
come available? 1. What helps
bring this about? 4. What soil
nditions help the work of the
seful bacteria? 5. What can the
irmer do to help their work and
help make plant food available?
and 7. How does the turning
ider of any vegetable material in-
ease crop yields? 9 and 10.

HIGHLY COMMENDABLE ACT

The Chicago Board of Trade
ised $100,000 for Kansas farm-
rs who lost their crops this
ear, to buy seed to sow for the
ext year's harvest. By reason
f the drouth last fall and winter farmers of fourteen western Kansas counties were in dire need of seed for this season's sowing. A committee composed of Joseph Badenoch, chairman; George E. Marcy, president of the Armour Grain Company; James A. Patten, B. A. Eckhardt, the miller, and James K. Riordon, a farmer and grain operator, were those named to raise the fund. This most worthy act of real assistance to these drouth sufferers will be appreciated by them and commended by all.

"J. C. Mohler, secretary State Board of Agriculture of Kansas, says: By its splendid action the Board of Trade has again proved its sincere desire to aid the grain farmer." The secretary headed a delegation that brought the matter before the board.

ANALYSES FIGURES

By Wm. A. Albrecht,
Associate Professor of Soils

Your correspondent asks for the explanation of the meaning of analyses figures of fertilizers as 2-12-4, 4-8-6, 6-8-4, or 3-8-3.

Fertilizers are made to contain mainly three plant foods, viz., ammonia, containing the element nitrogen; phosphate, containing the element phosphorus; and potash, containing the element potassium. In labeling the fertilizer or in specifying the plant food content for state inspection, the figures used represent per cent of ammonia, phosphate and potash, respectively, in available or readily usable form.

For example, the figures 2-12-4, above, represent a fertilizer that has 2 per cent of ammonia, 12 per cent of phosphate, and 4 per cent of potash. It means that there are twenty times as many pounds of each per ton, or 40 pounds of ammonia, 240 pounds of phosphate and 80 pounds of potash.

If you are buying a ton of a 2-12-4 fertilizer, you are buying 40 pounds of ammonia, 240 pounds of phosphate and 80 pounds of potash. These figures are the means of knowing what one is buying and such labeling tells more about the fertilizer than does some fanciful trade name like "Marvelous Corn Grower." Fertilizer manufacturers are using the figures more commonly and will do away with the trade names as soon as common practice and fertilizer talk uses the figures of per cent plant food content more widely.

When one of the three plant foods is omitted the figure 0 is used. A 0-12-2 means that the fertilizer contains no ammonia, but has 12 per cent of phosphate and 2 per cent of potash. Potash is often omitted as in a 2-12-0. It is well to learn the meaning of the fertilizer figures, for as we do, we know what we are getting and the purchase of fertilizers will mean getting so much plant food rather than "buying a cat in the bag."

In mixing fertilizers the materials used are not made up of the plant foods, ammonia, phosphorus, potash only; but these are contained in chemical compounds which carry these plant foods. For example, the 2 per cent ammonia is carried by a compound, ammonium sulfate. This carries sulfur and oxygen in addition to the ammonia. The phosphate is contained in the substance known as acid phosphate. This is made of calcium or lime, hydrogen, phosphorus, oxygen and some gypsum. The gypsum makes about half of this substance. The potash is carried, for example, by muriate of potash or chloride of potash containing chlorine as well as potassium. It is impossible to have 100 per cent plant food on this basis. If you have a ton of fertilizer containing 40 pounds ammonia, 240 pounds phosphate and 80 pounds potassium, as in a 2-12-4 fertilizer, the 1,640 pounds of additional weight is made up of the sulfate, the chloride, the gypsum, and other materials constituting the plant food carriers.

CHICAGO TO BE MARKET CENTER

The National Wheat Council have planned to establish their headquarters for their executive offices in Chicago. This will be moving King Wheat's throne from Liverpool.

VOTES IN FAVOR OF IT

J. E. Story, Hanover, Illinois, writes: Just received copy of your "SOIL IMPROVER," which I believe is destined to be one of the most important and profitable magazines printed for the American farmer.

I have always found that good land will grow big crops of corn or weeds while poor land will not grow either. Have taken greater interest in keeping my farm in a high state of cultivation than any other one thing.

I wish you success in your undertaking. I fully believe Mr. Baynes, your "SOIL IMPROVER" will be as needful and successful as the American Swineherd, of which I was among your first subscribers. In sending in my subscription for your latest magazine, I am yours respectfully for a still longer and useful life.

GIVE SOIL FAIR SHOW

(Continued from page 8)

store seed corn are stables, unheated basements, and oat bins.

How to Store

Many patented seed corn racks and hangers are on the market which do the work, but equally satisfactory ones may be made at home. In the seed corn house, a satisfactory rack may be made by nailing lath on the edges of 2″ by 4″, or 1″ by 6″ uprights. A space of from 3 to 3½ inches should be allowed between each pair of lath, thus holding the ears horizontal as on a shelf, but at the same time allowing free access of air to all sides of the ear. In places where the corn must be hung to prevent damage from rats and mice there are several good systems which may be used.

A popular method of storing seed corn is to use double strands of binder twine. Take about 20 feet of twine and tye the ends together to form a loop 10 feet long. Hold one end of the loop in each hand, making the one end a trifle longer than the other. Lay the first ear at the bottom of the loop. Cross the strings above this ear and lay the next ear in the strings, alternating the position of the butts and tips. Continue until the string is full, then pass the longer loop through the shorter and hang up by the longer loop. Ears may also be tied in a single length of twine.

Satisfactory hangers may be made by driving 10-penny finishing nails through any strip of wood which will not spit. The nails should be driven so that they are about 3½ inches apart on each side of the board and zigzagged enough to avoid splitting. If material must be purchased, ordinary lath are very satisfactory. Two lath are placed together and the nails driven through both of them from each side. Such hangers will hold from 18 to 20 ears, are cheap, and very convenient to use. Stiff wire loops should be attached by which to hang them.

What Causes Injury in Storage?

There are two sources of damage in storage—mold and freezing. Both may be prevented by rapid thorough drying. If the ear dries slowly, mold may spread along the cob and between the kernels, weakening or destroying the germination. Freezing inury is proportional to the temperature, the amount of water in the corn, and the length of exposure. Corn which contains less than 14 per cent of moisture will withstand any natural temperature. When the moisture content is higher than this, more or less injury will result from prolonged exposure to low temperature. Corn which contains from 14 to 17 per cent moisture will not be injured except by prolonged exposure to zero or near zero temperatures. If it contains more moisture, it will be more readily injured. That which contains 30 per cent will be injured by exposing 24 hours to a temperature of 28° F.

Is Artificial Heat Necessary to Produce Good Seed Corn?

Artificial heat is not necessary in most seasons in Ohio. North of the Ohio line, artificial heat is a practical necessity in securing first-class seed corn, but in Ohio the need for artificial drying decreases from north to south. It is always good insurance. Corn once dried out may be shelled and safely stored in any dry place, while corn in unreated buildings does not always become sufficiently dry to prevent injury. Experiments at Wooster gave an increased yield of 4 bushels per acre from fire-dried corn stored in a warm place over the same corn in unheated storage.

Just a little heat from some convenient source is often desirable in drying seed corn. The temperature should never go above 110° F. The corn should not be too near the fire, and especial care in ventilation is required.—C. J. Willard, Ohio State Uni., Dept. Farm Crops, September, 1923. No. 2.

FARMERS' BIG PROFIT

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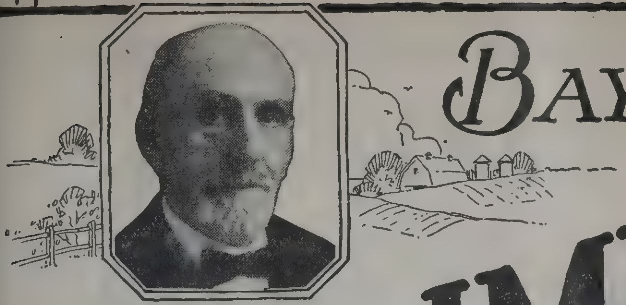

BAYNES' SOIL IMPROVER

A MAGAZINE

Devoted to larger crop yields

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

Vol. 1 NOVEMBER 1, 1923 No. 5

TRUE AMERICAN FARMER

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David Lloyd George, the brilliant world famous and most distinguished British statesman, recently pronounced on his first visit to America, with enthusiastic pride that our revered Abraham Lincoln, born an American farmer, was the world's matchless and greatest statesman.

The highest ideal of our ambitious young men should be to become a TRUE AMERICAN FARMER.

Published monthly by JAS. BAYNES & CO., *327 So. La Salle St. Chicago, Ill.*

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TABLE OF CONTENTS

Page
Prizes for Clubs........... 2
Elementary Study Course.
The Soil Contains the Food Elements.
The Treasury of the Farm.. 3
A Talk for Subscribers...... 4
EDITORIALS.
We Need You.
On Right Road to Market.
The Farmers' Council.
Farmers Only Want Justice. 5
The Farmer's Success Is Helpful to All.
Our Mission.
Marketing Farm Products.
Advice to Dirt Farmers...... 6
Looking for Farms.
Science Protects Agriculture.
A Farmer's Need.
Wise Farmers' Club.
Feeding Soil Compared with Pigs.
Preparing for Wheat in Ohio 7
Starting the Wheat Crop in Missouri.
Page
Science Applied to Indiana Wheat Raising 8
The Prize Contest.......... 9
The Need of Science at the Plow.
Cheerful Words.
Maintaining Sanitary Condition in Poultry Houses.
Cow Peas Easily Increased.
Productive Farms 10
Money-Making Sunflowers.
Timely Soil Topics......... 11
Home Mixing Fertilizers.... 13
World Hay Population.
Home Tanning Hides...... 14
Meats Coming Back.
Galvanized Bucket Warning.
Inoculation Essential for Alfalfa.
A Strong Endorsement..... 15
Wheat Growing Methods.
Illinois Wheat Growing.
Missouri Shows Us.
Figuring Base 16
Page
Farm Owning Emotion.
U. S. Wastes Fertility.
Milo-Maize.
Greets a Pioneer............ 17
American Farm Bureau.
Federation News 18
Howard on the Outlook.
Manure Not Sufficient in Itself 19
Judged by Experiment.
Fertilize to Fight Hessian Fly.
Winter Care of Farm Machinery.
Big Gypsum Orders........ 20
Elementary Study Course—Continued.
Liming Land 21
To Kill Grain Weevil.
Green Manure Ancient Means of Improving Soil........ 22
The Soil.
Things Farmers Should Know 23

PRIZES FOR CLUBS OF SUBSCRIBERS

We believe "BAYNES' SOIL IMPROVER" can be a good service to our farmers and that all accepting it for this purpose are sure to be benefited. The developments of the scientific researches of the Agricultural Colleges and Experiment Stations, also the varied experiences of many successful farmers, much of which has been costly, are furnished our subscribers.

We are supported in our claim of services by a number of farmers of high reputations for sound judgment and who have attained success as wise business farmers, who have said, every farmer with a desire to be efficient should subscribe for "BAYNES' SOIL IMPROVER." Several Professors of Agricultural colleges have commended the magazine.

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Each subscription for one year at 25 cents or for five years at $1.00, the five year subscription receiving as a premium the 70-page booklet, "Feeding Dairy Cows." The five year subscriber will count five in the club of subscriptions.

$10.00 Prize

We will pay to the person sending in the second largest club of new subscriptions taken in accordance with the foregoing requirement, ten dollars as a prize.

We will pay to the person sending in the third, fourth and fifth largest clubs of new subscriptions taken in accordance with the foregoing requirement, five dollars each as a prize.

Here is an opportunity for any one of the family to win a prize by calling on their neighbors, as no one would refuse subscribing and some of them for five years.

In the event of a tie for any of the prizes, we will give each person so tieing the full prize.

Send in your name to qualify as a contestant and receive sample copy and instructions, and give your friends, neighbors and othe a sweet invitation to subscribe f "BAYNES' SOIL IMPROVER the protector of the farm hom and start the farmer to increa his crop yields and his incom Get busy and see how easy it is win a prize.

WHAT BECOMES OF WASHINGTON

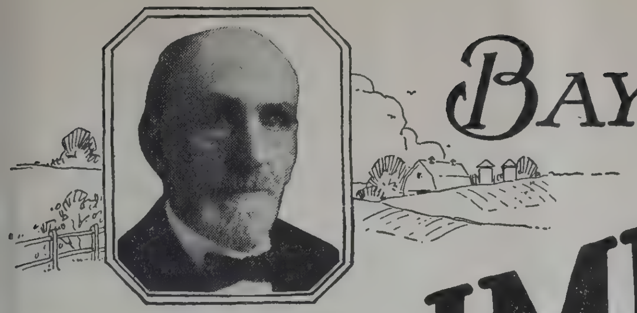
"If Abraham Lincoln is no the father of the United State will the Editor let us know wha becomes of Washington."

Reply — George Washingto will be the dear old grandfathe whom we can all honor.

NEW CORN CURES

The news has come in fro some sections of Iowa that som farmers were shucking new cor and selling it at 80 cents a bushe and were feeling so good over i they had almost forgotten the had been hard up.

Turn to page nine. Read th offer of an easy prize, and get t work.



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW
WHERE ONE NOW GROWS"

ol. 1 November 1, 1923 No. 5

HE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

he Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

Lesson 5

Keeping Up the Nitrogen Supply

1. The best and about the nly way for the farmer to keep p the supply of nitrogen in his oils is to grow legume crops nd add them directly or indiectly to the land. This not only eeps up the supply of nitrogen, ut also adds to the very imortant soil organic matter. Alalfa, sweet clover, compeas, soyeans and the clovers are comnon legume crops. These crops re added directly by allowing hem to fall down and decay on he land or more often by plowng them under. They are added ndirectly by feeding them to livetock and returning the manure nade. About two-thirds of the itrogen in feeds can be returned o the land in the manure made rom them. One-third, on the avrage, of the organic matter can e thus returned.

2. The farmer can add some itrogen to his soil by buying it n commercial nitrogen fertilizers uch as sodium nitrate or dried lood. The supply of such ferilizers, however, is very small and only a small amount of the itrogen needed could be added n this way. Also this is a very costly way of adding nitrogen. Commercial nitrogen costs about 20 cents a pound. At this rate the nitrogen alone in a 50-bushel crop of corn would cost $14.80. Nitrogen can be added very much more cheaply through the growth of legumes.

3. So far nothing has been said about how legumes are able to use the air nitrogen, whereas other crops can use only the nitrogen from the soil. To be exact, the legume plants themselves have no more power of using the air nitrogen than has the corn plant, for instance. They are able to use the air nitrogen only because some special forms of the very small plants or bacteria live on their roots. It is these legume bacteria which take the free nitrogen from the air and combine it into forms which can be used, first by the legume plants, and then when the legume plants decay in the soil, by other plants.

4. These bacteria live in the little lumps or nodules on the roots of the legumes. Did you ever dig up a legume plant to look for the nodules? On the red clover plant, for instance, they are small, about the size of clover seed, but quite numerous. On cowpeas and soybeans they are not so numerous, but are much larger, reaching the size of very small marbles. The nodules are found mainly on the smaller roots, and to be seen the plant must be dug up and the dirt carefully removed.

5. Sometimes there are none of these bacteria in the soil and legume plants grow without nodules on their roots. In this case, the legume cannot secure any nitrogen from the air, but must take all its nitrogen from the soil as does corn or wheat.

6. We speak of a legume plant which has the bacteria growing on its roots as being infected. For a legume plant to become infected, it is necessary that the bacteria be present in the soil, or that they be added in some way. This adding of bacteria by the farmer is called inoculation. Sometimes sufficient bacteria are added on the legume plant seed to inoculate the growing plant. When legumes have been grown for a long time in a community, as have the clovers and cowpeas in most parts of Kentucky, the bacteria are always present and the farmer does not need to bother about inoculating them. But when a new legume, perhaps alfalfa or sweet clover or soybeans, is grown, it is necessary for the farmer to add the bacteria in some way, for if the legumes do not become infected they not only usually make a very poor growth, but lose their biggest advantage to the farmer, that of using the air nitrogen. There are a number of easy ways of adding the bacteria, about which you can learn from your teacher.

7. Not all legumes have the same bacteria. The groups of legumes with the same bacteria are as follows: Red clover, alsike clover, white clover and crimson clover are in one group. Alfalfa and sweet clover are in another group. Cowpeas are in a group by themselves, and soybeans by themselves. Alfalfa, sweet clover and soybeans are about the only legumes which the farmer in Kentucky is likely to want to grow that he will need to inoculate.

8. Even when well infected legume plants get a considerable part of their nitrogen from the soil. In fact, they take all they can get from the soil and draw on the air only for the remainder they need. Thus legumes growing on rich land get more of their nitrogen from the soil and less from the air than do those growing on poor land. On the average, infected legumes take about two-thirds of their nitrogen from the air and one-third from the soil.

9. The nitrogen taken from the air by infected legumes does not remain in the nodules or even in the roots of the plants, but is used by the entire plant, and is left rather uniformly distributed throughout the plant in the tops and roots alike. This means that if the nitrogen taken from the air is to be added to the soil, the entire legume plant, or the manure made from it, must be added to the soil and not just the roots.

10. It is useful to know what part of the nitrogen of common legume crops is in the tops or hay portion, and what part is in the roots and stubble. Red clover has two-thirds of its nitrogen in the tops, and one-third in the roots and stubble. Alfalfa has three-fifths in the tops and two-fifths in the roots and stubble. Cowpeas and soybeans have nine-tenths in the top and one-tenth in the roots and stubble.

11. Since these legumes get one-third of their nitrogen from the soil in the first place, it is plain to see that the nitrogen left behind in the roots and stubble of the clover plant just balances that taken from the soil, and that there is not enough left behind in the roots and stubble of cowpeas and soybeans to equal that taken from the soil. This is true of practically all legumes. Alfalfa is the only one that contains more nitrogen in the roots and stubble than was taken from the soil, and even here the gain is not very much. Land cannot be built up if the entire legume crops are permanently removed from the soil.

12. It is true that very often large crops are grown after legume crops when nothing but the roots and stubble have been left on the land. This is because the supply of available plant food has been temporarily increased and does not mean that any plant food has been added to the soil or that any lasting good has been done the soil. Indeed, in the long run, the fertility of the soil has been lowered since, handled in this way, the legumes add to nitrogen and, being heavy feeders on the soil phosphorus and potassium, remove large amounts of these plants foods.

13. Good farmers do not grow the same crop in fields year after year, but change about. A succession of different crops grown on a field, then coming back to the first again, is known as a crop rotation. Corn, wheat and clover is a very common rotation in Kentucky as well as a very good one. Another good rotation is corn, soybeans, wheat and clover. There are many good reasons why every farmer should have definite rotations of crops which he follows fairly closely.

14. To keep up the nitrogen supply in soils, a legume crop should be grown at least once in every three or four-year rotation. Where land is very poor and low in nitrogen and organic matter, a legume crop should be grown every other year. It is also sometimes a good thing to sow what are called catch or cover crops in between the main crops. For instance, if land in corn is to lie over until the next spring, some crop should be sown in the corn in the late summer which will live over the winter and prevent soil washing and take up the soluble available plant food formed that would otherwise be leached down through the soil and lost. Rye is a good crop for this. Legume crops are also very often used this way. Crimson clover is a good one for this purpose.

15. By growing and properly handling a legume crop every three or four years; by growing cover crops when possible; and by taking proper care of the cornstalks, wheat straw and the like, not only should the nitrogen and organic matter in soils keep even, but it should increase, and the farmer is taking the biggest step towards making his soils very rich and able to grow much larger crops than are commonly grown.

Questions for Study: How can the farmer increase the supply of nitrogen in his soils? 1. What other useful thing is he doing at the same time? 1. Can th farmer add nitrogen in any othe way? 2. Why is it not wise f him to use the latter way? How are the legumes able to us the air nitrogen? 3. What i meant by inoculating legumes? 6. Where do legumes that ar not infected get their nitrogen 5. What part of their nitroge do infected legumes take fro the air, and what part from th soil? 8. How must legume crop be handled to add nitrogen to th soil? 9 and 11. Think of som advantages of crop rotation What good do catch or cove crops do? 14. How often shoul legume crops be grown?

(Continued on page 21)

A TALK FOR SUBSCRIBER

Our leading farmers acknowledge that the general farmer understand the soil problem les than any other department relative to the farm, while it is on of the most essential. The soi is the real foundation of the far and it should be thoroughly understood by the owner for hi benefit.

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The subscribers and readers o the magazine have an opportunit of the Study Course used b junior agricultural clubs in state agricultural college. Thu securing a study course wort $25 to the student for the subscription price of 25 cents.

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In justice to yourselves as well s fairness to us you should coperate with us in giving us a rial, since there is no risk to ou. All you have to do is to lant a quarter of a dollar into a ear's subscription for "BAYNES' OIL IMPROVER" and secure yield of a good crop of quarters benefit.

This one year's experience will rove to you the honesty of our urpose, and you will be anxious continue for the value you are eceiving, and desiring to help our neighbor you will advise him pay 25 cents for a year's trip n the road to success on BAYNES' SOIL IMPROVER."

There should be no trouble in our starting on the right road, you are as willing as we to nter the work for your benefit. he RIGHT when truly and yally supported, the great Linoln said, carried a power of itself hat would attain success.

We feel we are not misjudging he farmer in believing he will be as eager to join us in helping himself as we are to help him to success.

It would be reckless to injure oneself by refusing to join in an opportunity to advance one's personal interest and at same time the public good.

ON RIGHT ROAD TO MARKET

The American Farm Bureau Federation have planned a Nation-wide wheat co-operative marketing association, along the lines that have proved successful for other products.

In this way the farmers can keep informed and control the marketing and prevent rushing and overloading the market, having an orderly system through the National head.

We are encouraged by the high class of men who compose the committee to devise and adopt the system and rules for carrying on the business of the co-operative marketing. We have faith in their mastering the situation and attaining success.

We call attention to the article relating to this important movement on the American Farm Bureau Federation, page 18. We believe our farmers can look forward to the results of these efforts as producing the most powerful lever for their benefit, that has yet been accomplished by any organization.

THE FARMERS' COUNSEL

The value of good advice is beyond computation and is not always fully appreciated. To secure the full worth of the counsel given, those receiving it should have confidence and faith in the ability and integrity of the advisers.

The American Farm Bureau Federation have been extremely fortunate in choosing their officials. Their president, O. E. Bradfute and his predecessor, J. R. Howard, are broad-gaged men, of intelligence and splendid business ability; they have shown wisdom and good judgment in the execution of their official duties.

They are affiliated with officials who have been selected because of their special fitness for the duties required by their offices; in other words, experts in their line of work.

The qualifications of the chief officials for fulfilling the duties of their offices are of a high order. They have shown a tenacious devotion to the cause of the farmer that stamps them as fearless defenders of his interests. Their service has won the farmer's esteem.

This true loyalty is an indication of the final success of the farmer's cherished hopes of better marketing methods securing the producer a more equitable share of what the consumer pays.

THE FARMERS ONLY WANT JUSTICE

The American farmers only want fair treatment, this they demand as their inalienable right, which they believe the great majority of the citizens of other occupations are desirous they should have. They were the last industry to organize for the protection and benefit of their business, which has been to their previous disadvantage.

While there have been a number of failures among the agriculturists, but not out of proportion in their numbers with other vocations. A party who recently from Europe was travelling through the corn states, expressed great surprise upon meeting on a single day's drive more than two hundred automobiles driven by farmers. In New York he had listened to a western politician speaking, whose picture of the condition of the farmers were such as would not admit of them owning an auto.

It is a mistake to think for a moment of the farmers surrendering. The real sound thinking, good working farmers' prospects are growing brighter. The pork hogs marketed this year, is an immense increase over last year. The crop of corn has sold for the highest price it has reached for several years. Beef cattle finding a better market. Cotton and wool bringing good figures. Statisticians state that the aggregate receipts by farmers for their products during 1923 will be 500 million greater then 1922.

The sturdy, stalwart farmers will buckle up their courage for the coming year which will bring about better times, with co-operative marketing.

THE FARMER'S SUCCESS IS HELPFUL TO ALL

While a failure of crops is a direct injury to the farmer, being a failure of the food supply to support life, it therefore affects everybody to some extent.

The good yield of crops and profitable prices on the other hand is not only beneficial and helpful to the farmers but the profit and success is shared variably in by all.

The farmers are intensely anxious for the production of good crops. This necessitates having the soil in proper condition through feeding a scientific balanced ration to it as is shown elsewhere.

After the production of the crop, the price which the farmer receives for it is of equal importance to securing it from the soil.

The marketing of the farmers' product has been for years one of the most inefficient and unfair modes of disposing of the produce of the farm. There are too many different handlers between the farmer and the consumer, each getting a profit, all of which is deducted in advance from the price which the farmer is paid.

There is undergoing a reform in the manner of selling the livestock and other farm products. The American Farm Bureau Federation, an association organized strictly in the interest of the farmers. They have capable, honorable intelligent officers in the management of their business affairs. Being National, covering the whole of the United States, gives them a power of affecting and controlling the orderly marketing of the crops, and prevents the overloading of the market and saves a bearing of the price from such cause.

This Bureau has arranged cooperative Commission Associations which are proving a success and will be the means when covering all points of saving many millions of dollars for the farmers. We have shown each month in our magazine where splendid dividends have been paid to the farmers in the cooperative association.

The officials of the bureau management have high qualifications and are men of integrity and truly devoted to the farmers' cause.

The BAYNES' SOIL IMPROVER has great faith in the farmers' cause receiving immense benefit from the American Farm Bureau Federation. There may be some mistakes made in the starting, but no more than in other business managed by good business heads.

OUR MISSION

To Lighten the Farmers' Burdens and Increase Their Prosperity

Our efforts are devoted to resupplying the fertility of the soil which is its real productive strength.

The soil requires feeding of the elements necessary to furnish it with available plant growth of maximum yield.

This will be properly proportioned in nitrogen, phosphorus, and potassium, to make a balanced ration.

To have farmers all become familiar with the principles and details and practice of applying the ration.

Other essentials of increasing the yield and benefitting the farmer and in justice to the soil will be to use pure seed of standard quality, in some instances increasing the yield very largely.

We will also foster the cooperative method of marketing the farm products as a saving, a portion of the profits usually going to middlemen between the farmer and consumer.

And to advocate the increase of the number of freeholders among the farmers by dividing the large estates. Owners of their homes are more stable, have more pride in the care of their homes. Showing greater happiness and contentment by the proprietors and benefit in their citizenship.

MARKETING FARM PRODUCTS

The marketing of the products of the farm has been by a mode injurious to the farmer's interest. The system practiced has beclouded the brightness of the farmer's sky for many years. The producer and consumer are the two main parties in the transaction, yet neither of them exercise the power of fixing the price.

The middle men, dealers through whose hands the products pass between the farmers and consumers, make the prices for the farmer seller to accept and the user to pay. The farmer is not consulted as to the cost
his product, but to make the sa
is compelled to accept the pri
fixed regardless of his loss.

Hence, while in some instanc
the farmer fails to get the cost
his labor and expense, the li
of middlemen are all enjoying
profit on his product. In fact, t
farmer does not get his just a
equitable share of the amou
paid by the consumer.

These dealers fatten and
cumulate wealth at the farme
expense.

The co-operative marketi
methods of the American Fa
Bureau Federation is one st
forward to protect and save t
farmer to some extent.

When the bureau gets th
Co-Operative Marketing Depa
ment fully organized we expect
see the faulty marketing syste
remedied, and the farmer havi
a voice in fixing the price of
product.

The people of the Unit
States, from the laborer up, t
year were in a prime condition
pay the farmer $1.50 a bushel
his wheat, which would ha
greatly helped him and throu
him the public.

ADVICE TO DIRT FARME

Have been reading your S
Improver, and I heartily appro
it. Everything hinges on the pr
duction of the soil. You a
really editing a paper that appe
more to the American people th
any other farm paper, breedi
and stock raising included.

When mother earth is neglect
and not properly cared for, rig
ly handled and correctly diver
fied with everything taken off a
nothing returned to the soil, it
robbery instead of farming,
the farmers' injury and to t
hurt of the public.

Everything depends, more
less, on MOTHER EARTH
make the big machine work
the whole population.

If the general farmers as
whole would spend more ti
reading periodicals and writin
on the farm and soil I am sure
dirt farmers would get far bett
results and returns for our lab

I fully believe the people
general will get a great deal mo
good out of "Baynes' Soil I
prover" than the Great Americ
Swineherd, as we are all interest
in Mother Earth, when she fai

e machine will stop in a short ne.

I think "Baynes' Soil Improver" ur greatest achievement and ant to see the General Dirt rmer get behind it and boost it we need all the information on e care of the soil and its main- nance and improvement pos- ble.—James M. Kemp, Kenney, .. A Genuine Dirt Farmer.

LOOKING FOR FARMS

We hope to be in position to sist parties by bringing to- ther those looking for farms ith those having them for sale d thus be of service for both. ne farm is some different from y other industry, it provides a me as well as a business for e owner and occupier. To the dustrious farm youth or laborer is a good step in advancement d beneficial to civilization.

The five prizes offered on page ne and page two will go to me one, why not you?

CIENCE THE FORTRESS TO PROTECT AGRICULTURE

Charles H. MacDowell, of Chi- go, whose extensive research in is country and Europe, has ualified him to speak with the ghest authority on the question the fertility of the soil, says: Our Future National Strength epends on Scientific Study of oil Fertility—Weakness of astern Nations are Directly At- ibuted to Lack of Fertilizer for ood Crops. Definite Problems be Solved by the Chemist. To eed the People It Is Necessary Feed the Soil."

A FARMERS NEED

Mr. N. H. Gentry, Sedalia, Mo., leading breeder of Berkshire wine, whose fame as a distin- uished and successful breeder is ational, writes: "I do not claim be authority on soil improve- ent, but I do know that this ubject of soil maintenance and nprovement is the most impor- ant one, not only to the farmer imself, but of like importance to ll. And it is one that is least nderstood by the average armer.

"He needs to be taught, along hese lines and I feel that the field you have entered, in publishing of 'Baynes' Soil Improver' is one of the very greatest importance and necessity. It is a field in which you can without a doubt be of great service. I am sure your efforts along this line will be appreciated too, which will be your reward.

"I wish you success in this new undertaking. I expect to watch your publication from month to month as it appears, and am certain I will be benefited thereby. Sincerely your friend."

WISE FARMERS' CLUB

The Dempsey Farmers' Club, of West Virginia, have decided to study SOILS at their meetings this winter. The club members have each subscribed for the "Baynes' Soil Improver" to commence with the September issue which starts them with the Study course used by the Junior Agricultural Clubs.

The farmers composing the club recognize the importance of the soil problems and wisely determined to consider, investigate, research and study same with the assistance of their competent County Agent, Mr. T. H. Howes.

This is a good example for other farmers to follow. These farmers are securing the benefit of the Junior College Club of Schooling virtually free. Why not others follow their banner, as we can start them with September and they will get the full five months' course which should be worth twenty-five dollars to them.

FEEDING SOIL 1923—COMPARED WITH PIGS 1885

Our article in October on page 6, comparing the unscientific method of the ordinary farmer in feeding pigs in 1885, as the balanced ration was not understood nor practiced; they are now fully acquainted with the benefits which have been so well demonstrated, that the big majority practice feeding the balanced ration in 1923.

Feeding the soil the balanced plant food ration, is in the same condition with a majority of the ordinary farmers as they were in 1885 with the pigs. We have received several comments admitting the correctness of this comparison.

PREPARING FOR WHEAT OHIO CROP, 1924

(Wheat Following Oats)

As soon as possible after the oats is harvested, the soil should be plowed to a depth of five or six inches. If the soil is dry, we find it desirable to double-disc it before plowing. This prevents the formation of clods when the plowing is done and makes it easier to prepare a good seed-bed. As soon as the soil is plowed, it is desirable to run the cultipacker and smoothing harrow over it. All that is necessary from this time forward until seeding time, is to harrow the soil after each rain to keep enough loose soil on the surface to cover the seed. A seed-bed for wheat should be compact and the seed should not be covered more than a half inch.

At the time of seeding, from 250 to 400 pounds of fertilizer should be applied. Ordinarily, acid phosphate satisfies the requirements on a dairy farm. However, if the soil is not in a high state of productivity, it may be best to use a complete fertilizer such as a 2-12-2 or preferably a 2-16-2 at the rate indicated above. During the winter, if manure is available, it may be spread over the field to advantage. The rate of application should be reduced to as small amount as the manure spreader will permit, ordinarily from 2½ to 3 tons per acre. Such an application of manure will not only have a marked effect on the wheat but makes a wonderful showing on the following clover crop.

Some farmers seed their timothy in the fall but our experience is that it is best to delay timothy seeding until spring. This is for the reason that fall seeded timothy, particularly in favorable seasons, tends to reduce the amount of clover in the hay crop. It is our opinion that timothy is best used as a crop to fill in the bare spots where, for some reason, clover does not thrive and that it should not be given an advantage over the clover by seeding it in the fall.

Our practice has been to seed a mixture of 3 pounds of timothy, 3 pounds of alsike clover, 5 pounds of red and, if the soil contains plenty of carbonate of lime, 3 pounds of alfalfa or sweet clover. The choice between the last two is determined by whether the clover is to be cut for hay or pastured. All of this seed is sown in the spring in two equal applications. The first seeding is done when the surface of the soil is nicely honey-combed, in February or March, and the second seeding when the soil has been thawed out and the wheat has started to grow, the last of March or the first of April.

Under average conditions we expect a yield of about 25 bushels of wheat per acre. If special care is taken to prepare the soil, if the seed used has been one of the high yielding varieties selected by the Experiment Station (Gladden, Trumbull and Portage are suggested in Ohio) and if the weather is favorable, the yield may exceed 30 bushels or more per acre. On soil which has been well cared for in previous years and with the liberal use of a well chosen fertilizer, the yield may exceed 40 bushels per acre in favorable seasons.

FIRMAN E. BEAR,
Prof. Dept. of Soils.

STARTING THE WHEAT CROP IN MISSOURI FOR 1924

In reply to your later inquiry regarding seeding wheat, as a general rule early plowing in late July or August is the first formality in seed bed preparation for this crop. The soil might well be disked in advance of plowing, in order to cut up the weed growth, to break the crust and give a better final seed bed. Early plowing kills the weeds, saves the moisture and preserves the soluble plant food. Of course, deep plowing is always essential but the plow should not be deepened so suddenly as to turn up a large amount of raw subsoil. Subsoiling as a means of deepening the seed bed has not been profitable in this state and is not to be recommended.

During the summer the rains will work down a seed bed that is early plowed and give it the firmness that wheat needs. It will need to be disked once or twice and harrowed before seeding so as to produce a seed bed with a mellow surface but a firm bottom. Careful preparation of this kind will make rolling after seeding unnecessary.

When manure is to be applied, it might precede the disking and plowing for better incorporation into the soil. As to whether it is profitable on wheat, some experiment station results will answer. As a result of eight tons of manure, once in the four-year rotation of corn, oats, wheat and clover on twelve experiment fields, the net yields were increased 4.94 bushels, or 43 per cent. Manure can be profitably used on corn and it is the usually recommended practice to apply the manure on the corn and treat the wheat with phosphates or commercial fertilizer. In Missouri, as an average of all experiments over the state, 150 pounds of bonemeal applied to both wheat and corn in a four-year rotation, the yield was increased 5.29 bushels, while for 175 pounds of acid phosphate used similarly the increase was 5.8 bushels.

As to the variety of wheat that is usually recommended, this will be one of the soft, red, winter wheats. For north Missouri the station has been recommending the Poole and the Dietz, the former of which is a beardless variety. For central Missouri they suggest Fulcaster and Michigan Wonder, and for south Missouri, Fulcaster.

One might seed timothy in the fall, to follow with clover in the early spring, in case the soil is not too sour to produce this crop.

It is difficult to say just how much increase in yield one ought to obtain from such a treatment since this is dependent on the particular soil in question, but the increases suggested for the above fertilizer treatment are significant since they will be increases from an average wheat yield of 11.8 bushels to 17.3 bushels. The average yield of this crop in Missouri is exceedingly low and certainly there is an opportunity for profit in applying the above increases on most any farm.

Yours very truly,
W. A. ALBRECHT,
Associate Professor of Soils.

SCIENCE APPLIED TO INDIANA WHEAT RAISING

Replying to your inquiry about the preparation of ground in seeding winter wheat after oats, I would say that our common practice is to plow the ground as soon
as possible after oats harvest ar
work it down thoroughly, ar
then harrow it at intervals to st
any weed growth or volunte
oats until ready for seeding. W
usually plow seven or eight inch
deep. Just before seeding we
whatever is necessary in the wa
of disking, harrowing or rollin
to prepare a seed bed having
firm sub-surface with not mo
than two inches of loose soil
top into which to drill the see
We do not touch it after seedin
Whenever we top dress whe
with either manure or straw it
done on bare frozen ground du
ing the winter. We commonl
sow clover on wheat as early
possible in February, and like
get this seeding done before to
dressing. We find that two
three tons of manure are sufficie
for top dressing.

At seeding time we most con
monly drill with the seed 200
300 pounds of a high grade con
plete commercial fertilizer. O
much of our land we use a 2-12-
On the light colored and poore
soils it may pay to use more nitro
gen, and where little manure
used, some more potash also.
we have grass seeds to sow in th
fall, they are sown with the whea
through a special grass seed a
tachment on the drill. We con
monly sow timothy that way fo
mixed clover and timothy meadow
or pasture to follow the whea
Our average yields of wheat her
at the Central Station, both on th
brown second bottom land of th
University Farm and on th
"black and clay" land of the Soil
and Crops Experiment Farm
have averaged right around 3
bushels per acre during the las
35 years.

A. T. WIANCKO,
Chief in Soils and Crops,
Ind. Agrl. Expt. Statio

CONFIRMED

Worshiper (After Church)—"
have nothing but praise for th
new minister."

Church Warden—"So I no
ticed when the plate went round.
—Tit-Bits.

ON THE JOB

Ohio paper—The measles brok
out here last week. Sim Benson
the constable, caught them.—Bos
ton Transcript.

GRAND PRIZE OFFER

To the person sending us the greatest number of full paid, new subscriptions to

BAYNES' SOIL IMPROVER

before November 24, 1923, we will give

$25 CASH—

Here is an opportunity to make your spare time pay dividends. No farmer who is interested in his farm will refuse to pay 25 cents for a year's subscription to this up-to-date paper—it sells on sight.

$10 CASH—

will be given to the person sending the second largest number of new subscriptions and $5 each to the persons sending the third, fourth and fifth largest number of new subscriptions.

$50 IN CASH PRIZES—

Distributed between the five persons sending us the largest number of new subscribers, all lists to be mailed not later than Nov. 24, 1923, as shown by the postmark.

In the event of a tie for any prize the full amount of that prize will be given to each person so tieing.

HERE IS YOUR OPPORTUNITY

There are no restrictions—everybody is eligible—Men, Women, Boys, Girls, Everybody—enter the race to win a prize.

Sell either yearly subscriptions at 25 cents each or five-year subscriptions at a dollar each, the latter counting as five in the contest.

With each five-year subscription at $1.00 the subscriber receives as a premium a valuable 70-page booklet, Feeding Dairy Cows.

No entry blanks or coupons needed. Just send in your name to qualify as a contestant and receive your sample copies and instructions and then sell the subscriptions—it's easy (go where the crowd is and see how easy it is).

Send in your list (postmarked not later than Nov. 24, 1923) with the name, state, town and route number of each new subscriber plainly written, and accompanied by Post Office Order for the full amount, $1.00 for each five-year subscription and 25 cents for each single yearly subscription.

Remember, there is no guessing, no coupons, no uncertainty. Just send your name and receive your sample copies and instructions and **START.** The person sending the largest number of new subscriptions, accompanied by full cash payment, before Nov. 24, 1923, gets $25.00, the second largest number $10.00, and the third, fourth and fifth largest number, $5.00 each. A total of $50.00 in cash.

START TODAY—NOW

BAYNES' SOIL IMPROVER, Chicago, Ill.
327 So. LA SALLE ST.

THE NEED OF SCIENCE AT THE PLOW

By Chas. H. MacDowell, of Chicago, from his address at Annual Meeting, American Chemical Society, Milwaukee, Wis., September 10-14, 1923.

The standard that we must set up in our efforts to increase the yield per acre is to get more science at the plow. That will help us to make better use of our unlimited fund of farm information now lying in the libraries and archives of our public institutions. The Pennsylvania station found that the rational use of plant foods increased the yield of corn 36 per cent; oats, 31 per cent; wheat, 74 per cent; hay, 54 per cent. The Illinois station found that 200 pounds of fertilizer increased the yield of wheat from 16 to 28 bushels, 400 pounds from 18 to 36 bushels, and 600 pounds from 18 to 38 bushels per acre. In all these tests we must assume that all the other factors which make for better farming made it possible to get results with the plant foods applied.

We must get science at the plow. It is a local and national responsibility. Wise farmers will accomplish it first, and shall we not find some way through these few to reach the many? A story is told of an Illinois farmer who remarked the "soft corn will grow hogs like hard corn, but if one wants hard money one must grow hard corn." Proper feeding of the crop in the early season helps to advance the time of ripening, so the crop will escape the early autumn frosts. Hard corn brings a higher price, and there is an added value to the crop both in higher yields and in better quality products.

CHEERFUL WORDS

Henry Kelting, Martinton, Ill., one of our old time friends having been for years a subscriber of the Swineherd writes: "Allow me to compliment you for the courage you have shown in establishing the 'Baynes' Soil Improver,' your ne wmagazine. I know you have seen much of the agricultural development of the great United States step by step, and I admire your spirit in desiring to take a hand in assisting in the further advancement of the same.

"The modern fashion is to retire from the business strife and rest, rust and mold life away. You have my best wishes for your and Mr. Iron's success."

Our friend Kelting sent in a club of subscribers for our magazine at the start which was highly appreciated. I presume that most young people up to sixty, do not realize that older persons do as fully and richly relish a compliment as themselves.

BRIGHT SCHOOL GIRL

A bright little school girl, Mildred Trueblood, of Michigan, sent in a club of ten subscribers for "Baynes' Soil Improver" for a year each. Here is a pattern for some other school girl to follow and get a letter from the editor with thanks and commission.

A MEANS OF MAINTAINING SANITARY CONDITIONS IN THE POULTRY HOUSES

By Professor G. A. Olson

The poultrymen who use agricultural gypsum have learned that the air in their sheds is improved. This is due to the fact that gypsum prevents the escape of ammonia formed during the fermentation of the manure. It is a chemical process whereby ammonia is changed to ammonium sulphate, which is the form of nitrogen fertilizer manufactured on a large scale in Europe and to some extent in this country.

The process involved enhances the value of the manure since ammonia is four-fifths nitrogen, which is conceded to be the most valuable of plant foods. Since poultry manure contains about twice as much nitrogen as animal manure, it is obvious that there is present twice the risk of lowering the nitrogen value wherever conditions are favorable for the escape of ammonia. Agricultural gypsum sprinkled freely on the dropping boards and floors will prevent this loss as well as keep the air in the sheds from being contaminated.

Agricultural gypsum is not caustic and therefore is a safe substance to use. It is a natural constituent of water and is used in the making of bread. As a matter of fact, it is mixed in bra mashes for laying hens as a sourc of calcium. Obviously no on should fear harmful effects fron its use as a sanitary medium fo preserving the nitrogen of manure.

COW PEA CROPS CAN B INCREASED AS EASILY AS OTHER LEGUMES

What Agricultural Gypsum Ha Accomplished for Alfalfa and Clover

By A. B. Carson

Repeated and widespread results in California, Oregon an Washington have proved that th systematic use of agricultura gypsum increases the yield of alfalfa several hundred per cent What agricultural gypsum ha accomplished for alfalfa it is als accomplishing for clover, and recent experiments have demonstrated that it is soon to take it rightful place in the growing o cow peas.

The value of gypsum as a plan food does not end with th legumes. Increased growth o legumes means more nitrogen fo crops that accompany or follow them.

In the southern states, whil the preservation of soil is difficult, the restoration of humus i comparatively easy. In the tas of supplying the soil with nitrogen and humus, one of the mos important factors, both directl and indirectly, is the souther cow pea. In this connection, it i worthy to note that it can b profitably grown as far north a the Ohio Valley.

A heavy growth of cow peas i worth as much to the soil as a good crop of red clover. Agricultural gypsum alone or well mixed with barn yard manure assures a heavy growth.

PRODUCTIVE FARMS

Every progressive farmer is determined to have his farm a productive one. He makes it a business to keep the SOIL in a condition of fertility that will produce the maximum yields. It is this class of production that is profitable. The cost of production per bushel is less on full yields and your profits greater and more satisfactory.

The ambitious farmer is conantly planning his work for suriority in his crop yields. It us decreases the pound or ıshel cost of his grain crops, as ell as gratifying his fervent sh. It is a delight for a real rmer to visit his farm and view s efforts and results.

He is duly careful of the soil the heart of his farm, he atches the fertility pulse throbs, keep up its vigor for producveness. This character of a rm is that which makes the vner love his home, as the deart spot on earth. Reader, if ours is not productive, get on e band wagon of the "Baynes oil Improver" and it will take ou there.

ONEY MAKING BOUQUET OF SUNFLOWERS

There are some farmers who n dodge the wheat surplus by ing some thinking and working ıt on another line.

The Tuscola Journal of Illinois, scribes the twenty acres of sunwers grown by Thomas Bunıy, one mile west of Hayes. his crop is heavy and is now a vel sight to look upon. Not ar here is another field like is, say the Tuscola Journal.

Planting the seed soon after nishing corn planting, Mr. Bunıy found it an easy crop to culvate; one good plowing sufficed. ne and one-half pounds of seed the acre made the seed cost run 12 cents to the acre or $2.40 for his 20 acres.

When the flowers are fully matured, the crop is harvested by drawing a wagon with a closed rack, and a man standing at one side of the rack cuts off the heads. In this manner one man can harvest about one acre a day.

After harvest, the flowers are run through a corn sheller and are then ready for market.

The yield of a crop like Mr. Bunday's ought to be 2,500 pounds to the acre. The usual price paid for the seed is 4½ cents a pound, or a gross income of $67.50 to the acre.

The seeds are marketed for use as feed for fowls. There is a firm in Evansville, Ind., that buys most of the crops in Illinois and extracts the oil from the seeds. This oil is used in the making of soap.

SUITS COUNTY AGENT

R. L. Blackwell, county agent of Gordon county, Georgia, writes: "I have just received a copy of your 'Soil Improver,' October issue, which I like very much and also wish the back numbers July, August and September in securing subscriptions for three years. 'The Baynes' Soil Improver' made a hit with the farmers best man in the County."

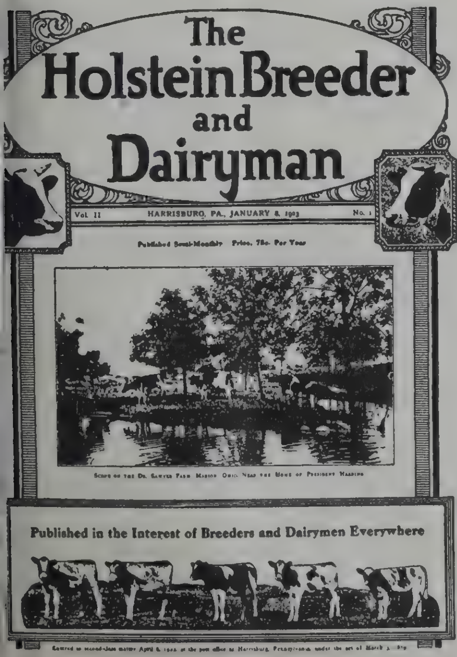
The prize easy to secure you will find on pages two and nine; it's bound to interest you.

TIMELY SOIL TOPICS

A Valuable Lesson on Bone as a Fertilizer

(Dept. of Soils, Ohio, State Uni.)

The use of bone as a fertilizer dates back to 1774 just prior to the Revolutionary War, and marks the beginning of the commercial fertilizer industry which has grown and expanded since that time until in 1914 over seven million tons of commercial fertilizer were sold in the United States alone. A century earlier, Brandt, an alchemist of Hamburg, had separated phosphorus from bones but at the beginning of their use as a fertilizer their value was not known or even suspected to be due to this element. Various erroneous theories accounting for the manurial value of bone were advanced but it remained for Liebig to announce to the world the correct explanation. Bone was first used in the county of Yorkshire, England, and a little later in Cheshire where it was applied to worn-out pastures. So highly did the English value bone for use on the land that they imported large quantities from continental Europe and later from America. The importation reached such proportions that Liebig became alarmed over the situation and wrote as follows: "England is robbing all other countries of the conditions of their fertilty. Already, in her eagerness for bones, she has turned up battlefields of Leipsig, of Waterloo,



The Holstein Breeder and Dairyman

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Published in the Interest of Breeders and Dairymen Everywhere

Let THE HOLSTEIN BREEDER AND DAIRYMAN

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and of Crimea; already from the catacombs of Sicily she has carried away the skeletons of many successive generations." Liebig's anxiety was perhaps more justifiable at that time in view of the fact that the immense deposits of mineral phosphates had not yet been discovered.

The Cupboard Nearly Bare

Since there is no large supply of bones remaining as a heritage from past generations the supply available to modern agriculture is directly dependent on the livestock industry. Bone fertilizer represents a product salvaged from waste and represents only a part of the phosphorus which was removed from the land in the crops eaten by the animals. This being true, we cannot hope to maintain the supply of phosphoric acid in the soil by the use of bone alone. It has long since been found necessary to depend most largely on mineral phosphates as a means of restoring the ever-waning supply of phosphorus in the soil. Our problem is one of adapting the different kinds of phosphate fertilizers to the place they are best fitted to fill.

Four Bones to Pick

As first used for fertilizer, bones were applied to the land in relatively large chunks, either plowed under without treatment or first composted and then applied. In 1829 an Englishman by the name of Anderson introduced a machine that would grind bones so that the coarsest would pass a one-half-inch mesh sieve. Appreciating the increased value of this finer product Liebig went a step farther and treated them with sulfuric acid, thus not only changing their nature physically but chemically as well. It was through this hint that Sir John Lawes a little later conceived the idea of treating mineral phosphates with sulfuric acid and initiated the production of acid phosphate which today furnishes the larger part of the phosphorus in fertilizers. In more recent years a large part of the bone used for fertilizer has been steamed to remove as much as possible of the fats and nitrogenous organic matter which have commercial values for other purposes. The bone residue from this steaming process is more easily ground to a fine powder than raw bone and is sold on the market as steamed bone. At present very little bone is acidulated except boneblack, which is obtained as a by-product of sugar refining. The composition of different samples of the same class of bone materials varies considerably but the following may be taken as averages for the four principal bone products on the market:

THE ANALYSIS OF BONE PRODUCTS

	Nitrogen	Phosphoric acid	Carbonate of lime
Raw bone	4%	20.5%	7%
Steamed bone ...	1	28.5	9
Acidulated bone...	2	16	...
Dissolved boneblack ...		16	...

Bone—Raw and Treated

Acidulated bone, often also called dissolved bone, is a product very much like acid phosphate chemically. It differs from acid phosphate, however, in carrying a small amount of nitrogen. Dissolved boneblack is in most respects a duplicate of acid phosphate. It is made by the acidulation of animal charcoal which is "spent" by repeated use in sugar refining. Hence these two products are more properly considered in connection with acid phosphate than with raw and steamed bonemeal.

Raw bonemeal, as the name signifies, is the raw, untreated bone ground to varying degrees of fineness. Owing to the fat contained in them, raw bones are difficult to grind finely and seem usually to disintegrate more slowly in the soil. However, Wollney found that bones which had their fat extracted with ether became available less rapidly than those which had been untreated, when supplied to crops under identical conditions. (He suggests, however, that this may have been due to antiseptic action of the ether in the freshly treated bone.) Steaming would of course sterilize the bones but would exert no after effect of an antiseptic nature which would tend to retard decomposition in the soil.

Steamed Bone—Best by Test

B. Schultze in 1913 reported, that steamed bone has a crop producing value of 62 and raw bone of 55, on the basis of equivalent amounts of phosphoric acid, as compared with acid phosphate rated at 100. In another test, but over a period of one year only, steamed bone of three degrees of fineness was compared with acid phosphate. Two methods of comparison, one that of measuring the growth produced, the other that of determining the amount of phosphoric acid the plant was able to secure from each material was used. Again rating acid phosphate at 100. Schultze reports the following values for the three samples of steamed bone:

RELATIVE EFFICIENCY OF ACID PHOSPHATE AND VARIOUS BONEMEALS

Material	Fineness	Basis of Crop Yields	Basis of Phos. Acid in Crops
Acid phosphate.	Ordinary	100	100
Bonemeal	45 mesh and less	34	36
Bonemeal......	Between 45-15	28	26
Bonemeal......	Over 15 mesh	24	24

It will be seen in this connection that bone shows to better advantage when considered over a three-year period than when the first year's results only are considered. Bone is generally thought to be more slowly available than acid phosphate but these results show plainly that its effectiveness is greatly increased by fine grinding. Probably if bone could be ground finely enough its immediate value would be more nearly the exact duplicate of acid phosphate. Over a long period of years a unit of phosphoric acid in bone can be rated as nearly equal in value to a unit in acid phosphate. Thorne, in reviewing twenty-four years of plot work at the Ohio Experiment Station, states that if we rate acid phosphate at 100, steamed bonemeal in comparison has averaged about 86 on the basis of the phosphoric acid carried. But steam bonemeal also contains a small amount of ammonia. This is thought to be of sufficient value to bring the product up to a par with acid phosphate. Thus, also the phosphoric acid of bonemeal is of slightly lower quality than the phosphoric acid of acid phosphate, the small amount of ammonia carried in bonemeal is a sufficient redeeming factor to make bonemeal equal in value to acid phosphate reckoned on the basis of total phosphoric acid in bonemeal and available phosphoric acid in acid phosphate. This, however, is only true when the results over a considerable number of years are considered.

Bonemeal vs. Limestone

Bonemeal contains sufficient percentage of calcium carbonate to register an effect similar to that of limestone on acid soils. While the amount of calcium carried is relatively small and insufficient to renew this element as rapidly as it is removed by leaching and in crops, yet the increase in yield due to lime is less on the emeal than on the acid phos- e plot at the Ohio experi- tal station. Lime require- t determinations of the soil hese plots, however, show no tive differences. It would 1, therefore, that little credit be given bonemeal as a sub- ite for limestone on acid soils.

voiding "Bone-Headedness"

onemeal, because of the ex- ency, of its effect on crop ds, has acquired a well-mer- popularity. Its mechanical dition is always good. It con- s a high percentage of phos- ric acid, and thus, even when gross amount applied is mod- e, the amount of phosphoric carried is enough to be ef- ive. It can be used to best antage by the man who owns farm and expects to continue ultivate it himself for a suffi- tly long time to derive a full sure of benefit from this more vly available phosphate. In British Isles a definite claim be laid by a tenant against landlord upon the expiration his lease for the value of un- austed manures applied dur- his tenancy. In the case of e applied recently this claim be relatively large. A com- 1 rate is to lay claim for two- ds the value of the bone ap- d the previous year, one-third the value of that applied two rs previous, and one-fourth of value of that applied three rs previous. To use bone in- igently one must look into the ure and expect to wait some rs for part of the returns ich will accrue.

n the final analysis the relative t of a unit of phosphoric acid bonemeal and in acid phos- ite should be usually the de- ing factor in their purchase. A iew of the experimental evi- ice plainly shows that bone- al is not worth any more than d phosphate on the basis of osphoric acid contained, and t if we are to consider them ial on this basis we must leave of consideration the small ount of nitrogen carried by ie.

EARL E. BARNES, Prof.

HUNGRY CLOVER

The English by-word was: over without manure makes father rich and the son poor. gumes must have fertilizers.— W. Schreiber, Sibley, Iowa.

HOME MIXING FERTILIZERS

There seems little reason to believe that the general adoption of the policy of home mixing of fertilizers would effect any considerable reduction in fertilizer costs to farmers. On the other hand, as long as most farmers buy factory mixed fertilizers, those who prefer to mix them on the farm have an opportunity to save from five to ten dollars per ton by so doing. A considerable number of farmers in Ohio have given home mixing a trial. Some of them are well satisfied to continue it.

Good Condition in Fertilizer.—Anyone who has used fertilizer realizes the importance of having it in good drillable condition. If for any reason the fertilizer is sticky and does not feed through the drill freely there will be a loss in its efficiency. Managers of fertilizer factories have had many years of experience with this problem and have learned some of the necessary precautions which must be taken if the fertilizer is to reach the farm in good condition. Many farmers are willing to pay for this service on the part of the mixed fertilizer producers.

Some Necessary Precautions.—Little difficulty is experienced with home mixed fertilizers if they are applied immediately after being mixed. When the weather is warm and damp and the bags are piled on top of each other and allowed to stand for several weeks before sowing, the mixtures sometimes "set." In order to prevent this, the mixed fertilizer manufacturer usually uses from 100 to 200 pounds of organic carrier of nitrogen per ton of the mixture. Such materials as animal or garbage tankage and muck or peat are used for this purpose and are very effective conditioners. If home mixed fertilizers must be compounded some weeks before using, it would be best to supply part of the nitrogen in the form of animal tankage or some similar high grade organic ammoniate. An equally good plan would be to add about 200 pounds per ton of thoroughly dried soil from the blackest spot on the farm.

Lime as a Drying Agent.—Occasionally, hydrated lime or limestone is used as a drying agent in fertilizer, particularly in acid phosphate which must be shipped out before it has had time to "cure" in the factory. About 50 pounds of hydrated lime or 100 pounds of finely pulverized limestone per ton of acid phosphate will effect a marked improvement in its drilling condition. Unfortunately the use of lime in this manner serves to neutralize the effect of the sulfuric acid which was used in making the acid phosphate with the result that its phosphoric acid tends to become less available. Furthermore, if the source of the nitrogen in the fertilizer is ammonium sulfate the addition of lime tends to liberate the ammonia. If lime is to be used for this purpose the quantity per ton should be limited to the amounts indicated above. Ordi-

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narily it is believed to be better practice not to mix lime and fertilizer before sowing, but to apply them separately to the soil.

Materials for Home Mixing.—The unmixed materials can be purchased from a number of companies who deal in them. If sulfate of ammonia, acid phosphate, and sulfate of potash are used as sources of ammonia, phosphoric acid, and potash respectively, all that is required is a shovel and a smooth floor on which to do the mixing. If nitrate of soda and muriate of potash are used it may be necessary to have a screen and some kind of implement with which to break up the lumps. A variety of other carriers are available but the ones indicated above are those which are most commonly used for home-mixing purposes. In the case of the ammonia there is reason to believe that if the rate of application is small the nitrate of soda is the most effective carrier. Where the rate of application is 1000 or more pounds per acre, it is probable that it would be preferable to use not only nitrate of soda, but sulfate of ammonia and animal tankage or some similar high grade organic carrier of nitrogen as well.

Suggested Mixtures.—There is little if any need to depart from the recommended list of analyses included in the "Ohio Standard Dozen Fertilizers." This list includes the following:

0-16-0
0-18-0
0-20-0
2-12-2
2-14-2
2-16-2
3-8-6
3-12-4
2-12-6
0-14-4
0-10-10
4-12-0

Suggestions as to the use of the various members of this list have been published previously and can be had on request. One of these analyses, whether purchased already mixed or compounded on the barn floor, can be expected to give as good results as any other analyses which could be suggested from any experimental evidence now available.

The Meaning of 2-12-2.—In the North, a 2-12-2 fertilizer is one which contains two per cent of a total ammonia (NH_3), 12 per cent available phosphoric acid (P_2O_5), and 2 per cent of available potash (K_2O). In the South the order is changed, the percentage of available phosphoric acid standing first. The above analysis would be changed in the South to read 12-2-2. In some states the percentage of nitrogen rather than that of ammonia is given. Two per cent of ammonia is equivalent to 1.64 per cent of nitrogen. If the combined weights of the several carriers of ammonia, phosphoric acid and potash do not total a ton the manufacturer adds sand or some other material to the mixture. Usually it is possible to select the materials in such a way as to total a ton without the use of a "filler." The farmer may accomplish the same purpose by applying less of the mixture than would have been necessary if a filler had been used.

Formulas for the 2-12-2.—Selecting the 2-12-2 as an example of a fertilizer analysis which might be desired, the following materials can be used in the quantities indicated to make up the mixture:

2-12-2—FORMULA A

Materials	*Pounds*
Nitrate of soda—18 per cent total ammonia (NH_3)....	220
Acid phosphate—16 per cent available phosphoric acid (P_2O_5)	1500
Muriate of potash—50 per cent available potash (K_2O)	80
Thoroughly dried black soil (preferably muck).......	200
	2000

2-12-2—FORMULA B

Materials	*Pounds*
Sulfate of ammonia—25 per cent total ammonia (NH_3)	160
Acid phosphate—16 per cent available phosphoric acid (P_2O_5)	1500
Sulfate of potash—48 per cent available potash (K_2O)	85
Thoroughly dried black soil (preferably muck).......	255
	2000

If the material is to be sowed immediately after mixing, the black soil or muck may be omitted and the rate of application correspondingly reduced. If animal tankage is substituted for part of the nitrate of soda or sulfate of ammonia the soil will not be needed.

Formulas for the 3-12-4.—A ton of 3-12-4 fertilizer can be made by using 240 pounds of sulfate of ammonia, 1500 pounds of 16 per cent acid phosphate, and 160 pounds of muriate of potash, leaving room for 100 pounds of some drying agent. If all three sources of ammonia were desired approximately 120 pounds each of nitrate of soda, sulfate of a monia, and animal tankage co be used, no conditioner bei then required. This would lea room for 160 pounds of muri of potash and 1480 pounds of a phosphate. The remainder of t phosphoric acid required for t 12 per cent would be more th made up by that contained in t tankage which could be expect to contain 3 or 4 per cent of t compound.

Firman E. Bear,
Dept. Soils, Ohio State Universi
August, 1923. No.

FROM MAYES CLIP SHEE

Missouri State Board of Ag culture

WORLD HOG POPULATIO

The hog population of the pri cipal pork producing countries the world now totals 227,413,0 head, or 14 per cent less than pr war average of hogs in the worl

NEW HOME-TANNING BULLETIN

Directions for tanning hides home on the farm are now avai able in handy form in the ne Farmers' Bulletin No. 1334 name "Home Tanning of Leather an Small Fur Skins." For free cop write direct to the "U. S. De partment of Agriculture, Wash ington, D. C."

NEW FARM BULLETIN

The United States Departmen of Agriculture, Washington, D C., has issued new Farmers' Bul letin No. 1289, entitled "Distribu tion of Types of Farming in th United States."

This bulletin is of importan value to farm folks who are con sidering whether or not they wil "stick" or jump out of the frying pan into the fire.

IS THE SILO DEAD?

The question "Is the Silo Dead?" is an inquiry that opens a big issue in relation to the complicated problems of profitable production of beef and milk. The secretary of the Missouri State Board of Agriculture declares

:, although this is evidently low tide in silo development he state, that the silo and sil- should and will come back. s not too early to revive the ldering fire of sentiment for campaigning in Missouri.

MEATS COMING BACK

'he American people are get- over some of the propaganda ited during the world war inst meat as a food necessity, re being an increase of six nds per person consumed in 2 as against 1920. The 1922 rage of meat eating was 149.7 nds. It is not difficult to ob- ve the somewhat increase in ularity of meat at the aver- table in town or country, ich is considered a hopeful by the Missouri State Board Agriculture.

GALVANIZED BUCKET WARNING

'he Bureau of Chemistry of the ited States Department of Ag- lture has sent out a radio adcast against using food or nk that has stood even for a rt time in a galvanized iron ket or other vessel. The reau also warns against using vanized iron containers in king preserves or jellies, or for ding cider and other fruit ces. The statement says that ny sudden and intense cases of ess result from zinc dissolved m galvanized bucket or other nsil.

OCULATION ESSENTIAL FOR ALFALFA

Perhaps no single forage crop more desirable than alfalfa, yet the state of Missouri there are s than 200,000 acres of alfalfa the 12 million acres in pastur- e or forage crops. This scarci- in the state of so valuable a p is due to the fact that alfalfa s four strict soil requirements, neglect of any one of which ll mean alfalfa failure. These sentials are (1) alfalfa requires sweet soil, (2) it requires a ep, well drained soil, (3) it re- ires a fairly fertile soil and (4) e soil must be inoculated with e proper bacteria. That not all these essentials are always neglected is certain, since the alfalfa acreage has been steadily increasing in Missouri. But evidently many of our soils do not fulfill the requirements. The first three essentials with respect to sweet, well drained and fertile soils are not so commonly neglected by the alfalfa beginner, since they are demanded by many other crops—but the fourth requirement, namely the inoculation not common to other crops—is often neglected and is responsible for many failures with alfalfa.

Alfalfa is a legume crop, and as such requires the presence of certain bacteria on its roots for proper growth. These bacteria are present in soils where alfalfa has grown for many years, but are not present where this crop has not been grown. On such new lands the bacteria must be introduced if the crop is to succeed. They may come by chance in spots through manure, wind or water carrying them from some other alfalfa or sweet clover field, or even in the seed, but this gives too scattered results to establish the crop. So when seeding alfalfa on land not growing it commonly, it is wise practice to inoculate the seed and to distribute the bacteria directly on to the field.

This is such a simple operation that its value as insurance cannot be neglected. Five to ten pounds of finely powdered dry soil from a field growing well inoculated alfalfa or sweet clover can be mixed with a bushel of dampened seed. By dampening the seed slightly some of the soil will stick. Any surplus soil may be scattered with the seed. Artificial cultures of bacteria grown especially for the purpose may also be put on the seed. In fact, any method which spreads with the seed the essential bacteria that help the alfalfa get nitrogen from the air, rather than from the soil will serve to inoculate the crop. On soil where alfalfa has not grown before, inoculation is one of the big essentials and will prove a costly mistake if neglected. When seeding a legume, especially alfalfa, give it all the care of good seed, good seed bed and then in addition be sure that the soil is inoculated.

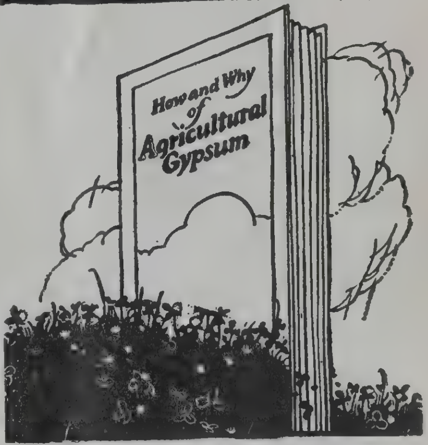
W. A. ALBRECHT,
Associate Prof. of Soils, Mo. Agr. College.

A STRONG ENDORSEMENT

The Bridgeport Publishing Co., of Chicago, in sending in a dollar for five years' subscription for "BAYNES' SOIL IMPROVER" and 74 page booklet, "Feeding Dairy Cows" as a premium, states they think the paper is the best of its kind ever published and asks to start with the July issue as they don't want to miss a single copy of this paper.

W. L. Trueblood, Pewamo, Michigan, sending in one dollar for "BABYNES' SOIL IMPROVER" for five years and premium "Feeding Dairy Cows," states, he is highly pleased with the Soil Improver as it furnishes valuable and practical information to meet the needs of the farmer.

It is almost as easy to achieve foolishness as it is to be born foolish.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WHEAT GROWING METHODS

The method pursued in the section surrounding Bloomingburg, in Fayette County, southeastern Ohio, is given us by Ed. Klever, one of the leading breeders of Poland-Chinas for years, after attaining success as a breeder, who now rents his farm for cash and keeps a few acres for a small herd of Poland-Chinas for his enjoyment, admiration and happiness, and they are compelled to be good ones.

He says that wheat follows corn and there is no plowing for it, the corn is cut and shocked and the ground disked and the wheat drilled, some commercial fertilizer used from drill. Clover seed is sown in February or March. Some years the crop is good, 30 bushels and sometimes very poor.

ILLINOIS WHEAT GROWING

James M. Kemp, Kenney, Illinois, a prominent breeder of Poland-Chinas, and a successful diversified farmer, gives us his plans of preparing for the wheat crop as follows:

"We commence plowing for our wheat as early as possible. This year we broke our wheat ground early in August. Worked it down by harrowing it good and then double disking, leaving it then until ready to sow. Then roll with a corrugated roller which levels and smooths the ground for the drill, as the ground was plowed a good depth, 4 to 5 inches.

This ground was a wheat stubble and had lots of green stuff grow up this year. We find wheat ground good to resow on, better than to follow oats, but prefer clover ground when we have it.

We use a disk drill and put seed in a fair depth. The drilled wheat winters better than when broadcast. We disk and harrow until we get a fine seed bed. It depends upon the season for the condition, requires more one year than another. We seed with turkey red hard wheat as it winters well.

We have always used home made manure and clovered all we could. Our yield this year was about 23 bushels to the acre, last year it was 27½ bushels. This year the cold dry spring and much freezing and thawing hurt the stand quite a little.

Walter E. Ivins, breeder of pure bred Poland-Chinas, of Franklin, Butler Co., Ohio, gives their usage as follows: We sow wheat on a three year rotation of tobacco, corn, wheat and alfalfa. Following the harvesting of tobacco or corn the ground is disked and harrowed until a fine seed bed about three inches deep is secured, one disking and a double harrowing produces the desired seed bed.

The wheat is a standard winter variety, is drilled in rows eight inches apart, sowing from 7 to 8 pecks per acre. At same time sowing two quarts of timothy seed, and seeding alfalfa in the following spring. No commercial fertilizer is used but the ground receives eight tons of barnyard manure per acre the spring before sowing which has proven satisfactory on the ground in the Miami valley.

In addition we pasture practically all the ground on the alfalfa years and have no trouble in not holding the fertility and increasing it in the past 17 years.

Our yield ordinarily runs from 25 bushels an acre up, having had yields as high as 40 bushels in favorable years.

MISSOURI SHOWS US

G. E. Petty, Versailles, Mo., one of the popular breeders of Poland-Chinas in his state and who wisely puts his faith in diversified farming gives us his practice in wheat growing as follows: "We have a Fordson Tractor that does all the work except seeding. We plow the ground in July if possible or as early as we can as we believe it pays big in the yield and plow good and deep. Every evening we drag down the day's plowing. We use a heavy railroad rail, about 14 feet long. It does fine work, it only takes a few minutes to unhitch from the plows and hitch to the drag, this keeps the ground from getting hard and dry and smooths the plowed ground nicely.

It gets the full benefit of the rains and is in good shape to disk. We use a tandem disk and drag down the same as when plowing. We do nothing more until it is time to get in shape to sow, unless grass and weeds start. If so, we disk to keep green vegetation down.

When time to sow we dis then put harrows to tractor ar cultivator behind harrow, usir both at same time and under o dinary conditions we have a fi seed bed. Then we drill o wheat, following the tractor wi teams to our drill using 1½ bu wheat to the acre and 125 lb bone meal.

We like to get our wheat sowe by October 10. We had 90 acr in wheat this year that makes little better than 26 bus. per acr I think it was the nicest field ever saw, not a skip in the fiel We only put in 47 acres this yea to cut down the surplus, but w got it in fine shape. Our o dinary yield is from 20 to 3 bushels.

Wishing Baynes Soil Improve success.

O. S. West, Paullina, Obrie Co., Iowa, in the northwest pa of the state. He states, there no winter wheat raised in his se tion. Having lived there for 4 years and has only seen in tha time but two or three field Years ago it was tried and yielde fairly well but the party has sow none since. The main crops a corn, oats, with clover for ha and pasture. Corn this year is fair crop, in fact better than i sections farther south or east i Iowa. He reports his 225 head o pure bred Duroc pigs comin along fine and one of the bes average bunches he has eve raised of the real utility hog Evergreen Park Farm is note for its princely palatial residenc crimson herd of Durocs an Rhode Island Red chickens.

FIGURING BASE

In a survey made by the University of Illinois including 22 farm records of one year each, i was found that the averag amount of manure recovered an nually was 6.6 tons for each dair cow, and 5.45 tons for each of th work animal units maintained o these farms. Thus thirty dair cattle units per 100 acres of tillable land would be necessary t manure at the rate of eight ton per acre in a four-year rotation.

IMPORTANT ANNOUNCEMENT—SEE PAGE 9

It is evident that a program for l improvement must include : conservation of farm manures d the addition of such fertilizer iterials which are being lost ›m the farm as will prove profit-le. For example, at the Ohio ition an average increase over period of years, of 72 bushels corn, 33 bushels of wheat, and ›00 pounds of clover hay has en obtained from a ton of acid osphate used with manure.

ARM OWNING EMOTION

A young lad living upon a nted farm all his life, until 16 ars of age, obedient, industrious d only child of his loving par-ts, well schooled through high hool; upon their purchase of a iall farm, says with highly rought up feeling: "Mother, its vely to have our own farm." ie ownership, causes a heartfelt iotion that is sublimely and yfully elating.

The natural effect of being a eeholder, is for any good per-n to become a better and eater citizen. May we not rive to increase the number of rm owners.

UNITED STATES NOW WASTING FERTILITY

The following comparison aces the United States at a sadvantage so far as agricul-ral efficiency is concerned. Al-ough our country is fifteen nes as large as Germany, we oduce only the same amount of irley and not quite twice as uch oats. Germany produces x times as many potatoes and velve times as much rice. When e war broke out, Germany had)00,000 farms, averaging 15 :res, and we had 6,340,000 farms, reraging 138 acres. These Ger-an farms produced 40 per cent ore wheat, rye, barley, oats id potatoes, taken together, than e produced. Within the last iirty years, Germany has in-eased her per-acre yield of rye om 15 to 29 bushels, while the nited States increased only from to 16; Germany increased her :re yield of wheat from 19 to 30 ishels, the United States from to 15 bushels; Germany in-eased the yield of barley from to 39 bushels, the United States om 24 to 24.3 bushels; Germany icreased per-acre yield of oats om 31 to 59 bushels, the United States from 28 to 30 bushels; Germany increased the yield of potatoes from 115 to 208 bushels, the United States from 98 to 100 bushels. Germany has an area equal to the three states, Minnesota, Iowa and Missouri, and under normal conditions produces 88 per cent of her food requirements. With a population a little over half as large as the population of the United States and with only one-fifteenth the land area, Germany shows an agricultural efficiency about six times that of the United States.

From Chas. H. MacDowell's address before American Chemical Society.

MILO-MAIZE

One of our subscribers from Collinsville, Ill., asks for information into the methods of planting and cultivating Milo-Maize. Prof. W. L. Burlison of the Agronomy Dept. of Colllege of Agriculture of Urbana, Ill., answers his inquiry as follows:

Milo-Maize is planted on any good type of land. The soil is prepared just as land would be prepared for our great staple Indian Corn. The crop is usually planted at the time, or very soon after, corn is planted. In Central and Southern Illinois from around May 10 to 30 would be considered quite satisfactory. Milo-Maize is planted just about as we plant corn, in rows three or three and one-half feet apart. If for hay, it is well to distribute the seed so that we may have a plant every two or three inches. If for seed, planting should be done so that there will be one plant each six to eight inches. The amount of seed varies somewhat but three or four pounds will be found sufficient. Most of our ordinary corn planters will plant Milo-Maize seed if a special plate is provided. Some have preferred to seed Milo-Maize with the common grain drill, stopping up the right nummer of holes to distribute the rows about every three feet. There is nothing unusual about the cultivation of Milo-Maize. It is handled just as corn is handled. It is necessary to exercise more care than with corn because the plants are very small. The crop can be cut with the corn binder or cut with the corn knife, just as common corn is put up. There are specially designed machines for removing the heads from Milo-Maize, especially the kind with the straight neck. Threshing is accomplished with the ordinary threshing machine. The yield of this crop might well be expected to run from 15 to 35 bushels around Collinsville, Illinois.

GREETS A PIONEER

Fred E. Barnes of the Colorado Agricultural College and Experiment Station says: "We have read the October issue of your magazine through with much interest. I find it is clean, snappy and inspirational and as far as I know is a pioneer in a field that has been discovered and filed on by no other publication.

"I congratulate the editor for his discernment, and for his courage in leaving the old and well established beaten paths and striking out in a field where none have gone before. You are 83 years YOUNG!"

READ THE BIG PRIZE OFFER ON PAGE 9 OF THIS ISSUE

FREE TRIAL

NO MONEY TO THE POSTMAN

We show our unlimited confidence in Profit-Maker Worm Capsules and in all hog breeders by offering to send, without one cent down, enough capsules to rid your hogs of worms.

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Gentlemen: Send me, all charges prepaid,.......... Profit-Maker Worm Capsules, which I will give according to directions and report results promptly to you. If results are what you claim, I will pay 5 cents apiece for the capsules within 10 days. If they do not produce the results you claim, the charge will be cancelled.

Name..........

Address..........

American Farm Bureau Federation New

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

NATION-WIDE WHEAT ORGANIZATION FORMED

Group Meet in Chicago and Draw Up Plans for National Co-op

Plans for a nation-wide organization of wheat growers into standard commodity co-operative marketing associations were launched Monday, October 8, at a conference of farm leaders held in the Drake Hotel, Chicago. The plans, as finally adopted, call for the organization of state marketing associations along lines similar to the cotton and tobacco co-operatives and to the wheat marketing associations in the northwestern and southwestern states. A National Advisory Committee was created to work out the details of the plan and to assist the several states in organization work.

The movement, which resulted in Monday's conference, was originated by national farm leaders who have been closely identified with successful co-operative marketing movements in the United States, including Judge Robert Bingham of Louisville, Ky., who led the movement for the organization of the tobacco growers; Aaron Sapiro, nationally known co-operative marketing expert; Walton Peteet of the American Farm Bureau Federation, and others.

The call for the meeting was sent out by Judge Bingham and was addressed to limited number of men who had been identified with the organized co-operative movement, and other men of national standing who are known to be advocates of co-operative marketing. Among those present were: Judge Robert Bingham, of Louisville, Ky.; Wm. H. Settle, president of the Indiana Farm Bureau Federation; Ex-Governor Frank O. Lowden of Illinois; Walton Peteet of the American Farm Bureau Federation; Dan A. Wallace, St. Paul, Minn.; Geo. C. Jewett and Geo. A. Davis of the American Wheat Growers' Associated; Carl Williams of Oklahoma; J. C. Chappelle of Kansas; Alexander Legge of Chicago; Bernard Baruch of New York; C. V. Gregory of Chicago; Aaron Sapiro of Chicago.

Among the visitors at the conference were: Eugene Meyer, Jr., managing director of the War Finance Corporation; Frank W. Mondell of the War Finance Corporation; H. S. Yohe of the U. S. Department of Agriculture.

It was the unanimous judgment of the conference that the only permanent solution of the wheat marketing problem of American farmers was to organize co-operative marketing associations which could control the flow of wheat to market and by proper financing and merchandising methods stabilize the price at levels which will return profit to the growers. Mr. Sapiro reported the progress of similar organization work in Canada and Australia. Eugene Meyer, of the War Finance Corporation, stated that as the result of his experiences with the cotton and tobacco co-operatives and a careful study at first hand of conditions in Europe, he was convinced that co-operative marketing could be successfully applied to wheat and that only through such organization could the distress of wheat growers be relieved.

He pledged the support of the War Finance Corporation to the organization movement and assured the conference that the national administration was in entire sympathy with the movement and that without desiring to direct or control it he pledged the support of himself and his Department. Mr. Mondell assured the conference that their work would have the approval of President Coolidge and the national administration. Mr. Peteet, speaking for the American Farm Bureau Federation, pledged the co-operation and support of the Farm Bureau. Mr. Jewett, representing nine northwestern co-operative wheat marketing organizations, pledged their support.

An Executive Committee was formed, consisting of Ex-Governor Frank O. Lowden, chairman; Robert Bingham of Louisville, Ky.; W. H. Settle of Indiana; George C. Jewett of Mi nesota; Carl Williams of Ok homa; Dan Wallace of Minn sota; Senator Arthur Capper Kansas. A special committee work out the relationships of t movement to state organizatio was appointed, consisting of V. Gregory of Illinois; Walt Peteet of Illinois; Carl Willia of Oklahoma. Herman Steen Chicago, was elected secretary the committee.

Mr. Sapiro and Mr. Peteet the General Committee will me the directors of the Americ Wheat Growers Associated Denver, Colo., on October 30, work out the relations with t northwestern wheat co-operativ

Aaron Sapiro was employed counsel and will write the ma keting contract which will tendered to state organizati committees.

Another meeting of the Exe utive Committee will be held an early date to map out plans f an intensive campaign in the i portant wheat growing states du ing the approaching winter a spring. According to the pla approved, each state will dire its own campaign, with the ge eral approval and support of t National Committee.

FEDERATION COMMITTE OUTLINES LEGISLATION

Signified Intention of Takin Referendum Before Congress Convenes

Members of the Legislati Committee of the American Far Bureau Federation lunched wi President Coolidge, October and discussed in detail with th President the Farm bureau's leg islative program for the next se sion of Congress. Representin the farm bureau were O. E. Brac fute, president, General E. Wood, Kentucky, Frank Ap New Jersey, W. G. Jamison, Co orado, and Edward B. Reid, a sistant Washington representa tive.

The legislative program, as out

d to President Coolidge, re-
cted itself to eight general
ıts, the farm bureau represen-
ves assuring the President
it was not the purpose of the
eration to develop a long, in-
ed program, or to interest it-
in things not directly affect-
farm interests.

n certain points the commit-
held open their opinion and
cated that a referendum would
taken of the entire farm bu-
membership, so that the
n bureau legislative program
ıld accurately reflect the true
h of the membership.

The Eight Points

Truth-in-Fabric.
Insist goods to be labeled showing percentage of virgin wool.

Muscle Shoals.
Favors original Ford offer and amortization plan.

Price Fixing.
Oppose governmental price fixing.

Immigration.
Favors further restriction.

Merchant Marine.
Want Merchant Marine without subsidy.

Consolidation of Railroads.
Decision held pending referendum.

Taxation.
Opposes sales tax.

Crop Insurance.
Desires government to investigate.

OWARD ON THE OUT-LOOK

J. R. Howard, former president
the American Farm Bureau
deration, in his instructive talk
farmers, closed his forceful
alysis of the agricultural sit-
tion as follows:

'What is the limiting factor
lay in American agriculture?
me say it is soil fertility and
at since our productive public
main is gone, it is doubly im-
rtant to maintain fertility in
ler to support our rapidly in-
asing population. Others say
at greater capital is the essen-
l need of the farmer, that be-
use of too limited capital he is
her too much restricted in his
orts or has to make too great
e of credit.

"Still others will tell you that
e greatest need on the farms today is labor, steady, intelligent workmen, caring for the livestock and running the more and more complicated machinery in season and out.

"But 'tis none of these. The limiting factor in American agriculture is, and probably always will be, price.

"Give us the price for our products and we will get the labor which will create the capital, which, after all, is but accumulated labor. With the labor and the capital we will maintain the fertility of our fields and the quality of our herds. And remember, by price we mean not dollars and cents, but that balance of values that will take a full load to town and bring a full load home."

MANURE NOT SUFFICIENT IN ITSELF

In the Kansas City Weekly Star a Missouri contributor states that "Manure is the only complete fertilizer" and further that "The old fogy supposition still taught by some that by feeding crops to animals we lose from 15 to 40 per cent of the fertility, is untenable. To that theory is due the belief that manure is not a complete fertilizer. Fertilizers can be profitably used with manure when soils are deficient in certain elements of fertility."

By way of correction, Dr. H. J. Waters makes the following brief, clear and concise statement of the value and limitations of manure: "The idea set out by the writer that 'what has produced one crop will produce another' seems sound enough, but as a practical fact, barnyard manure does not contain all the food the plant has taken from the soil. A part of the minerals which fed the plants has been withdrawn by the animals which consumed the plants and has gone into growth, milk, wool, bone or feathers.

"It is true that barnyard manure contains all the elements required for the growth of plants, but seldom in the right proportion to produce the largest yield of crops. An experiment at the Ohio Experiment Station covering a period of fourteen years shows that when fifty pounds of acid phosphate is added to one ton of barnyard manure, the profit, after paying for the fertilizer, is twice as great as from the use of the manure without the phosphate. These results were obtained, of course, on land that was short of phosphorus, as are most Missouri soils that have been cultivated for many years.

"It is also incorrect to say that the mineral elements contained in the plant are practically all found in the manure. Fully one-fourth of the phosphorus contained in the plant is removed by animals. It is for this reason that the practice of re-enforcing manure with phosphates has been so profitable in most places where it has been tried.

"All of this does not mean that barnyard manure is not the best fertilizer on the farm, but as a rule there isn't enough manure produced to meet the needs of the farm, and because of this fact green manure crops should be grown to supplement barnyard manure. In many cases it will pay to add a reasonable amount of commercial fertilizer of the right sort. Phosphates will pay their way on most soils, especially for wheat.

"Prosperity on the modern farm has been built on just these: Right use of fertilizer and barn manures, proper tillage, good seed, crop rotation, drainage and liming."—Pennsylvania Farmer.

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JUDGED BY EXPERIMENT

Manure and acid phosphate for 15 years made an average yield of 71 bushels of corn an acre, and 27 bushels of wheat an acre, and 5,400 pounds of clover. With manure only, the yields were 59 bushels of corn, 21 bushels of wheat and 4,300 pounds of clover. This was made by an Ohio Agriculture Experiment Station. And from this they announced that in live stock farming, the commercial fertilizer purchased may be limited to phosphates.

The Illinois Experiment Station found that during four years the value of the produce from the land receiving phosphorus was twice as great as that from the untreated land. Also the fact that where phosphorus is deficient in the soil it must be applied in order to increase and permanently maintain fertility or productive power. At moderate prices either bone meal, acid phosphate, or fine ground natural rock phosphate may be used with profit.

It is determined that the manure spreader is one of the most beneficial and helpful implements used on the farm. Besides relieving the farmer of hard work, the spreading is done so much evener and systematically, it is a profitable investment.

FERTILIZE TO FIGHT THE HESSIAN FLY

"A second measure for meeting the attack of the Hessian Fly, as mentioned above, is to fertilize the crop well. A balanced fertilizer or one containing a large amount of nitrogen and phosphoric acid will give it a vigorous growth and the greatest amount of stooling. During the following Spring, when the young maggot is living on the young wheat stems, heavy application of fertilizers will increase the number of stems sent out by the plant and in that way lessen the injury of the fly. The vigorous growth of the stems themselves make a stiffer straw and larger stem which enables them to withstand the attack of the pest."—New Jersey Agriculture.

If you want to help a good cause turn to page 9 and to page 2 and introduce the matter to your neighbor who will thank you for same and you can earn a prize.

WINTER CARE OF THE FARM MACHINERY

The time will soon be at hand when the major portion of the farm machinery will be laid up for the winter, and it is a matter of considerable importance as to whether this expensive equipment will be well cared for, or left out in the weather until next Spring.

All machinery should be housed for the winter, and besides this there should be a thorough inspection given each machine before it is put away. All broken parts should be noted and repairs ordered now, so that there will be no delay when the machine is again needed. All bearings and working parts should be well cleaned and then oiled to prevent rusting. All loose bolts should be drawn up tight, and minor repairs made at once.

If it is impossible to house the machinery, precaution should be taken against undue exposure to the elements. Machines should be well covered with a canvas, after being oiled, or a wood frame covered with tar paper provided to cover the working parts.

A little care at this time will do away with a great deal of trouble in starting out next season.

The agricultural engineering department of the Agriculture Extension Service, University of Missouri, has blueprints of two very serviceable types of implement sheds. These blueprints are listed as C-27 and C-56, and may be had for 10 cents each. Address the Mailing Room, College of Agriculture, University of Missouri, Columbia.

THE SOIL'S SUPERIORITY

The late Dr. Cyril G. Hopkins pronounced it necessary that every farmer should recognize that the primary basis of general prosperity is the SOIL, from which are produced, diectly or indirectly, the principal supplies of food, clothing, and fuel required by most of the people.

I. C. R. R. KILLS WEEDS

The Illinois Central railroad destroys the weeds and unsightly growths along their tracks helping the view, and being beneficial to the adjoining farm land where the seeds are liable to be blown if allowed to ripen. The railroad people can take pride as well as their passengers in the better dress given the road and the weeds decrease each year.

The weed killer consists of a
arsenic and caustic soda solutic
diluted before spraying.

This solution is sprayed on th
ballast section and is absorbed b
the weeds, which dry up and a
killed, the effect being similar
that of heavy frost.

The sprinkling train is operate
at fifteen miles an hour, coverin
the territory quickly and impro
ing the appearance of the roa
In addition to the economy, se
tion labor, which is normally use
for cutting weeds, is released f
other service.

On a big railroad the cutting
weeds is one of the largest e
penses from which no direct ben
fit is derived. A weedy trac
presents a dirty appearance an
interferes with the operation
trains.

BIG GYPSUM ORDERS

U. S. Gypsum's business co
tinues to show a large increas
According to President S.
Avery no recession has been e
perienced, even during July an
August, when there was a notic
able slackening in other lines
business.

"Improvement in our busine
has been steady and stron
throughout the year," said M
Avery. "This, of course, has bee
due to the revival of the buildin
industry all over the country. A
though we looked for some rece
sion in the trade, we have exper
enced none and there seems
be nothing in sight to prevent
continuance of the present goo
business."

KEEP IN MIND

Good seed corn will bring
good price and be in big deman
next spring.

Missouri is welcoming broo
corn, as an agricultural produ
by Secretary Mayes as a profi
able crop. There are 39 broo
factories in Kansas City and on
warehouse with a capacity f
600 cars for this year's storag
Missouri will show the whea
farmers how to diversify.

CHANCE

May—"How did you chance to mee
your second husband?"

Mary—"Oh, just by accident. H
ran over my first husband with hi
car."

(Continued from page 4)

LESSON 6

LIMING LAND

Nothing was said in Lesson
bout the soil conditions best
ed for the life and work of
valuable legume bacteria.
se bacteria, like the decay
teria which make plant food
ilable, can work well only
en the soil is loose and moist
not too cold. There is an-
er condition which most leg-
bacteria and, to a less ex-
decay bacteria demand, and
t is that the soil be free from
rness or acidity. Many soils
Kentucky, are sufficiently acid
eep the legume bacteria from
g their best work.

There are a number of sub-
nces or compounds with a sour
e which are called acids. The
r taste of vinegar is due to the
sence of one of these. There
a number of other compounds,
hout this sour taste which are
ed bases. Limestone rock is
ommon example. When an
l and a base are mixed to-
ner, chemical action takes
e between the two which
nges both and forms a new
ipound with no acid proper-
at all.

Acid soils are due to the
sence of acids or of acid form-
substances in them and to
absence of bases.

In very wet, undrained
s, the decay of organic matter
tes acids, but on well drained
s this does not happen. The
dition of the acid upland soils
Kentucky is due mainly to acid
erals which have been left be-
d from the old rocks and be-
se bases present originally
e been leached out in the
inage waters.

To get rid of the acid con-
on of soils, it is necessary only
dd some basic material. The
c materials most commonly
d for this purpose are the cal-
n compounds; calcium carbon-
or ground limestone; calcium
de or burned stone or kiln
; and calcium hydroxide
water-slaked or hydrated
. Not all calcium compounds
basic. Calcium sulfate, com-
nly called gypsum or land
ster, is not basic, and does not
ect acidity. The application
some basic compound to neu-
ize soil acidity is called lim-
land.

The bluegrass soils of Kentucky and also a considerable belt of soils in western Kentucky were formed from limestone rocks originally and hence would not be expected to be very acid, but in time the surface soils of even limestone regions become acid, because the limestone slowly goes into solution in the soil water and is leached down through the soil and lost. Some of the surface soils in the limestone regions of Kentucky have thus become acid. Outside of the limestone regions nearly all the upland soils of the state are acid. Gray bottom land soils also may be acid to an injurious extent.

7. Liming land, by helping the work of the decay bacteria and thus by increasing the amount of available plant food, especially of nitrogen, helps the growth of all crops—non-legume crops such as corn, wheat and timothy, as well as legume crops—for a time directly. It is probably, however, that on most soils, for most crops, liming supplies no limiting plant food. Lime compounds, it is true, do contain the plant food, calcium, but it is believed that even on acid soils there is sufficient calcium in non-basic form for use as plant food. The important thing we do know very certainly is that liming acid soils helps very much to grow more and larger legume crops and thus to add to the small supply of nitrogen in our soils. It is clear, therefore, that to get the best results from liming, legume crops must be grown and added directly or indirectly to the soil. The liming of land without the growth of legume crops, if kept up long enough, will finally result in making soils poorer rather than better.

8. Not all the different legumes are injured to the same extent by soil acidity. Alfalfa and sweet clover are injured the most, and will not do well even when the soils are only slightly acid. All the clovers are fairly sensitive to soil acidity, but will do very well when there is only a small amount of soil acidity. Soybeans are a little less sensitive yet, and cowpeas get along about as well when the soils are not extremely acid as they do in soils free from acidity.

9. The growth of alfalfa or sweet clover should not be attempted anywhere in the state without liming unless limestone fragments are known to be present in the surface soil. Practically all the upland soils of the state outside of the bluegrass region should be limed for the clovers and for soybeans. Hardly any of the soils of Kentucky are acid enough to need liming for cowpeas.

10. In addition to this general information, a farmer can judge fairly well as to whether his soil is acid or not by the growth of plants. Where the clovers make only a poor growth, and where such weeds as horseweed or sheepsorrel, become numerous, liming is needed. Blue Litmus paper, which can be procured from druggists, is also very often used to tell whether land is acid or not. A piece of the blue Litmus paper should turn pink if pressed between two parts of moist acid soil and left for about thirty minutes. If the soil is not acid, no change in color will take place. The presence of limestene in soil can be told by the addition of hydrochloric acid (commonly called muriatic acid) to the soil. If limestone is present, there will be a bubbling or effervesence. In chemical laboratories it can be told not only whether soils are acid or not, but if acid, how much limestone should be added to make them sweet.

11. Of the three basic calcium materials—burned lime, water-slaked lime and ground limestone—the last is the one most often used to correct soil acidity and under most conditions the best one, since it is the cheapest and least disagreeable to handle. However, ground limestone is more bulkv than the other materials. In neutralizing value, 56 pounds of burned lime equals 74 pounds of water-slaked lime, and equals 100 pounds of ground limestone. Where there is a very long haul, it might pay to buy the burned lime, since one pound of it goes almost as far in neutralizing value as two pounds of ground limestone. It depends mainly on which can be applied the cheaper per equal neutralizing value. It should be remembered that water-slaked lime, as compared with burned lime, contains 18 useless pounds of water in every 74 pounds of material to pay freight on and to haul. Air-slaked lime is between water-slaked lime and ground limestone in composition, but is finer than the latter.

12. Ground limestone for use on land should be fine enough so that most of it will go through a 10-mesh sieve (10 meshes to the linear inch, or 100 opening per square inch), and so that 40 per cent of it will go through a 60-mesh sieve.

13. Ground limestone can be applied at any time in the rotation. It is very often applied in the fall to plowed land which is to go into wheat and to be seeded to clover the following spring, but any other time will do about as well.

14. Best results will be obtained by the use of about two tons per acre at the first application and one ton every four years thereafter. Less than a ton is not to be recommended. Limestone leaches out of soils at the rate of 300 to 500 pounds per year, and it is therefore necessary to keep applying it. For alfalfa and sweet clover it is better to apply as much as four tons per acre at the first application. It can be spread best by the use of a limestone spreader. (Spreaders can be purchased through most implement dealers). Small amounts can be spread in other ways. Where the largest immediate results are wanted, it should be applied after plowing and worked into the surface soil. Otherwise there is no objection to applying before plowing.

15. Ground limestone costs at present in Kentucky from $1 to $2 per ton on cars at the quarry. It is sometimes cheaper to get ground limestone by the use of small portable crushing outfits on the farm.

Questions for study: What are sour soils? 3 and 4. Why are they not good farming soils? 1. What part of the soils of Kentucky are acid? 6. What are the materials used for correcting soil acidity? 5. Which is most often used and why? 11. How much should be used? 14. When and how should it be applied? 13 and 14. If liming is to pay, what else must be done?

INFINITESIMAL START

He—"When I began business on my own account I had nothing but my brains."

She—"That was indeed a small beginning." — Boston Evening Transcript.

TO KILL GRAIN WEEVIL

The Missouri State Board of Agriculture quotes Dr. Leonard Haseman, entomogist of the College of Agriculture and Experiment Station on two methods of killing and controlling grain weevil, particularly in wheat, as follows:

Carbon bisulphide is recommended for ordinary farm and home use in fumigating wheat, other grains and beans.

To fumigate, use a commercial grade of carbon bisulphide if it can be secured, as it is cheaper. Select a day when the temperature is 70 degrees or higher.

For the average wheat bin use about one pound to each 100 cubic feet of bin space or roughly for each 100 bushels of grain. In more open bins or cribs increase the dosage to three or more pounds.

The best results cannot be secured in an open, well ventilated corn crib since the gas escapes too rapidly. Spread old sacks or rags over the surface of the grain and sprinkle the liquid on these. These fumes will thus form more rapidly and being heavier than air they settle down through the grain, destroying the pests. Keep fire away as the fumes are explosive.

Since this chemical is explosive, it cannot safely be used in elevators and warehouses where danger of carelessly handled matches must be taken into consideration.

Insurance organizations in some instances refuse to insure elevators and mills in which carbon bisulphide is used to kill weevils. Therefore, the only thing that grain dealers and farmers' elevator associations can do is to leave carbon bisulphide alone and probably turn to carbon tetrachloride which is not explosive. This chemical must be used at double the dosage of carbon bisulphide.

For the farm grain bins the recommendation is carbon bisulphide, because it is both cheaper as a fumigant and better. The farmer can be trusted to guard against bringing fire near his building during fumigation.—Mo. Clip-Sheet.

READ THE BIG CASH OFFER ON PAGE 9 OF THIS ISSUE

GREEN MANURE ANCIE
MEANS OF IMPROVIN
SOIL

Green manuring—plowing u
green crops—as a means of
improvement, although it has
emphasized in recent years,
hardly be called a new discov
says the United States Departn
of Agriculture. It is really on
the oldest methods. Crops for
purpose were used by the ancie
the Romans using lupines, w
were sown in September
turned under in May for the b
fit of the following crop.

In Germany the use of lup
began in the middle of the n
teenth century and has proved
important factor in reclaiming
sandy lands of parts of Prussia
England legumes and other pl
are commonly used; in India
Japan the farmers gather g
plants of many kinds, someti
even cutting twigs from the t
and carrying them to the rice fie

In the United States the use
special green manure crops is m
more general in the South tha
the North. Under irrigation
play an important part in orch
culture in the West, but not un
dry farming conditions.—U.
Agri. Dept.

James Gibb, Biggsville, Illin
encloses Post Office Order
$1.00 for five years subscriptio
"BAYNES' SOIL IMPROVE
and premium 74-page book
"Feeding Dairy Cows," he kn
a good bargain at first sight.

Pick up an easy cash prize
will be like picking ripe strawb
ries that were awaiting for y
See pages two and nine.

CREDIT PRETTY GOOD

Grace—"Oh, Mr. Nocoy
How lovely of you to bring
these beautiful flowers! H
sweet they are, and how fre
I do believe there is a little d
on them yet!"

Nocoyne—"W—well, yes, th
is; but I'll pay it tomorrow."

WORDS WORTH WHILE

Greene—"Did you ever hear an a
er-dinner speech that was really wo
while?"

Dean—"Only once. Last night
dined with an old acquaintance a
he said: 'Waiter, bring me
check.'"—American Legion Week

THE SOIL

he soil produces the dress that ıes the earth with the green s, the golden grain, the luscious :, the rich foliage. To enable keep up the production it is ssary to feed it the nitrogen, sphorus and potassium and soil, digest and assimilate e elements by natural process, produces its wonderful work.

INGS FARMERS SHOULD IOW—NITROGEN FROM GUMES PURE VELVET

P. Clark, Extension Agrono- gives for the benefit of ıers the following lecture on subject of green manure:

n growing a crop for green ure some consideration must given as to where the plants re the material from which plant fiber is built up.

n the case of sorghum or rye vn for green manure, almost entire plant is secured from erial already in the soil. The elements the plant secures the air is the carbon diox- Therefore, since the plant res nothing from outside the it cannot return any surplus lity to the soil.

The soil is the nation's bank, all those who are drawing on fertility of the soil must see t that the fertility is main- ed or increased, if the high returns are to be continued. ghum or rye, when plowed er as a green manure, im- es the physical condition of soil through the beneficial ef- s of humus (which is partially ayed organic matter). This ius makes plant food already he soil more available, in- ses the water-holding capac- and opens the soil so that air roots can penetrate more ly.

When legumes are plowed er for green manure they of- increase the amount of plant l available. This increase is ely nitrogen. Different le- ıes have the following nitro- content per ton (this includes roots as well as tops):

lfa	21 pounds
peas	12 pounds
beans	15 pounds
d peas	16 pounds

"Four tons of green cowpeas is about as large a crop as one could expect under average conditions in Arizona. These four tons with the roots contain 48 pounds of nitrogen. Of this 48 pounds, probably from one-third to two-thirds, or 16 to 32 pounds, come from the air. Theoretically, a crop of cowpeas when turned under as a green manure puts back from 16 to 32 pounds more nitrogen than it secures from the soil. This is clear 'velvet' so to speak.

"Since legumes secure nothing except the nitrogen from the air, they add nothing more than nitrogen to the soil.

"Humus is needed in any soil. Commercial fertilizer will not supply the much needed humus. The south is and for years has been using commercial fertilizer, but their cotton crop is not increasing in acre yields. Green manures are a big help, but do not fill the need entirely. We must plan and follow a diversified farming system, using live stock and green manure as well as cash crops."

AN URGENT NEED FILLED

R. H. McCown, Kirksville, Ky., in subscribing for "Baynes' Soil Improver" says: I congratulate you upon publishing a magazine for which there is such an urgent need today, covering a field so technical in a most comprehensive manner. With my best wishes for your success.

A Chicago family motoring to their old home in Iowa passed a truck loaded with milk cans. Mary Ellen, a bright tot of eight summers, in the front seat with her father, said: "Daddy, the milk bottles in Iowa are larger than they are in Chicago."

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Good schools and roads.

The farmer is entitled to a larger and more equitable share of what consumer pays.

RN TO PAGE 9—IT MAY BE MONEY IN YOUR POCKET

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Webster Bldg., Chicago, Ill.

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in Soil Management

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See contest offer on page 9

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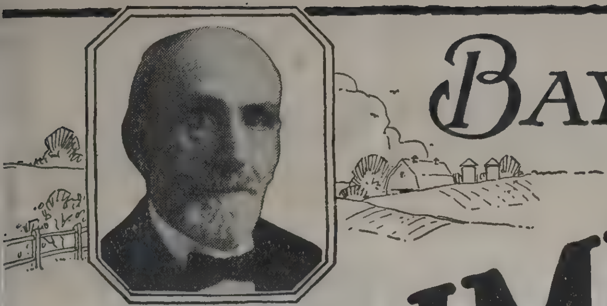


BAYNES' SOIL IMPROVER

A MAGAZINE

Devoted to larger crop yields

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

l. 1 DECEMBER 1, 1923 No. 6

DEPENDS UPON THE FARM

The Soil is the principal asset of the Farm, its worth or value is determined by its fertility, the key to its productiveness. More and deeper thought and better care is now being given to improve and increase the yield of the Soil. The Agricultural scientist has revealed the working of nature's law in feeding the soil that through a form of digestion supplies a plant growth in response and in accord with the feeding.

Therefore, the dependence of the yield rests upon the fertility, which further depends upon the feed given as set forth by the scientist for the benefit of the farmer.

The Farm, with a rich treasure of productive Soil, is the safest investment of all classes of property.

It furnishes shelter and produces food for the farmer, his family and employees, as incidental to the marketable crop, which is the gain or dividend on the investment.

To bring about the best results requires the practical use of the scientific knowledge developed from the Agricultural Colleges and Experiment Stations.

With diligence and skill now readily obtainable, wonderful progress and success in crop growing has been attained by the farmer. Yet, it must not be forgotten, the All Wise Creator is the sole controller of the rain, a crop producing necessity, to whom we should all feel grateful.

Published monthly by JAS. BAYNES & CO., *327 So. La Salle St. Chicago, Ill.*

SUBSCRIPTION 25 CENTS A YEAR

TABLE OF CONTENTS

Page
Order Christmas Gifts.
Make Farmers Happy...... 2

Elementary Study Course.
The Treasury of the Farm.
Keeping Up the Phosphorus Supply 3

Growing Nebraska Wheat.
Just a Rule.
Midwest Farmers Buying Worn Out Farms........ 4

EDITORIALS.
Wheat Surplus Perplex.
Legumes Your Friends.
Dust Thou Art to Dust Returneth.
Tenants Opportunity....... 5

The Soil Deserves It.
Diversified Farming.
Talk About the Farmer.
Brighter Headlights Indicate Improvement 6

Facts on Winter Feeding.
Buckwheat Cakes........... 7

Page
Illinois System of Permanent Soil Fertility.............. 8

Co. Agricultural Advisers' Department.
Faith in the Co. Agent.
County Agent Work.
Soil Fertility Program.
Co. Agent Wins Promotion.. 10

Approves the Plan.
Wider Use of Soy Beans.
Bill Nye's Cow Copy....... 11

Results of Fertilization on Sweet Clover.
Efforts of Experiment Stations 12

Orderly Marketing.
Not Growing Enough Flaxseed 13

Hogs Soil Improvers.
Missouri Paragraphs.
Practical Constructive Rotations 14

Farm Implements and Machinery 15

Page
Restored Farms' Credit.
Legumes—Stable Manure.
European Nations Fertilize.
Getting a Stand of Clover... 16

American Farm Bureau Federation News.
Government Holds Wheat Cost Hearing.
Acreage Reduction in Wheat Urged 18

Pool Alfalfa Orders.
Sales Turnover in Iowa..... 19

Spreading Manure.
Population of U. S. Increasing 20

Farmers Marketing with Consumers.
Be Economical............. 21

Chemists Work the Solution.
Crop Costs in 1922.......... 22

Find Fall Plowing Pays.
Plant Refuse Divided Between Fire and Soil.
Who Gets the Money.
Poultry Survey............ 23

ORDER CHRISTMAS GIFTS MAKE FARMERS HAPPY

For $1 you can make an appreciative gift to five farmers, with one year's subscription to each of them of BAYNES' SOIL IMPROVER, a magazine approved by agricultural colleges, experiment stations, American Farm Bureau Federation and successful farmers in many states.

Send in a dollar bill with names of five farmers with their postoffice address you wish to compliment with the gifts. We will credit each of them with one year's subscription for the magazine, and will send the person making the gifts, a card to be mailed each subscriber, notifying them of the gift.

For $2 you can contribute to the pleasure of ten farmers with each, one year's subscription to BAYNES' SOIL IMPROVER.

For $5, any one can make 25 farmers joyous; they are sure to be pleased upon the receipt of each month's issue.

The soil is the most important of the farm problems. It is the lifeblood of the farm. The success of every industry depends upon the production of the soil. This is the era of soil studies. The BAYNES' SOIL IMPROVER is right in style. The parties making these gifts will not only contribute happiness to the receiver, but will be a true benefactor.

We shall be pleased to serve every one with these gifts.

Address: BAYNES' SOIL IMPROVER, Webster Building, Chicago.

EXTRACT NITRATE FROM THE AIR

Gray Silver, agent of American Farm Bureau, who is the head of a committee of investigation in Europe, was present at a plant located at Halle, Germany, and saw 2,000 tons of nitrate extracted from the air which was being sold for agricultural fertilizing for $40 per ton and was the same as American farmers are paying $65 per ton at the mines and imported from South America.

Mr. Silver has decided to recommend to the Farm Bureau Federation meeting in Chicago, December 8, to have Congress maintain the project to operate the Muscle Shoals as a nitrate plant.

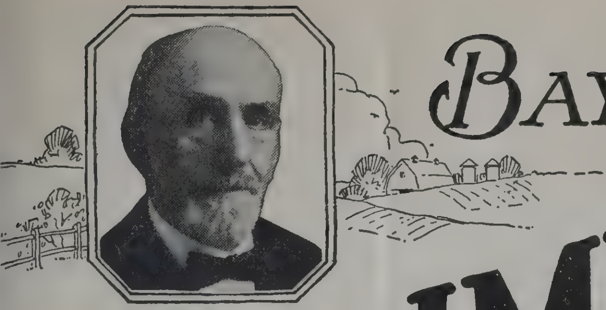
The German plant at Halle
now operating 24 hours d
with 16,000 men, working th
shifts, to produce cheap nitr
for the German farmers, and
government will not allow
exported.

It uses coke exclusively
power now, buying every po
of coke from England, but
spite of the high costs
making 20 per cent nitrate
the retail price of $40 a ton
makes good profits besides.

If abundant electric power w
available at the plant, the m
ager told Mr. Silver, it could p
duce nitrate for between $20
$30 a ton.

In extracting nitrate from
air the only chemical necessary
a cheap calcium sulphate, wh
is found in the Hartz mounta
in large quantities.

It is hoped that our gove
ment will be as loyal to the far
ers' interests as the German g
ernment is to their farmers' rig
and needs. Here is a natural
source for the farmers' requi
ment and it should be sacred
supply the hungry Americ
farms and not sacrificed.



BAYNES'
SOIL IMPROVER
"MAKE TWO BLADES GROW
WHERE ONE NOW GROWS"

l. 1 December 1, 1923 No. 6

HE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

e Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

Lesson 7

Keeping Up the Phosphorus Supply

. You perhaps recall that after rogen, phosphorus is the plant d most needed in Kentucky s. You remember that the sup- of phosphorus is very low in the soils of the state except the legrass and many of the bottom- d soils.

. Unlike nitrogen, phosphorus be added to soils only by its rchase in fertilizer form. There a number of different kinds phosphorus fertilizers. Fertili- s supplying mainly phosphorus often called phosphates. Phos- rus is also supplied in smaller ounts along with nitrogen and assium in other fertilizers. It rly always pays to buy the phos- ates since the phosphorus is aper in these and the nitrogen l potassium in the other forms erally do not pay any way on linary farm crops.

. Farm manure and crop resi- es also contain phosphorus; a of either farm manure or wheat aw, for instance, contains about pounds of phosphorus. How- r, this phosphorus was taken m the soil in the first place and return to this soil while reduc- the loss and thus the amount essary to buy, actually adds hing to the total supply in the l.

. The more important phos- rus fertilizers are: raw bone al, steamed bone meal, raw rock phosphate, and acid phosphate.

5. Raw bone meal and steamed bone meal are by-products of the large slaughter houses and packing plants where the meat animals of the country are killed in large numbers. Sixty-six per cent of the weight of the bones of animals consists of a combination of phosphorous, calcium and oxygen. Bones thus contain much phosphorus. However, only about a tenth of the bones accumulating at the packing houses is made into fertilizer. The best parts of the bones are used to make buttons, combs and many other articles of trade. At the best, only a small part of the phosphorus needed on soils can be supplied thru bone fertilizers.

6. Raw bone meal is simply the untreated bone ground up as finely as possible. It contains more gristle, fat and meat particles which remain with the bone. In making steamed bone meal, the bones are put into large, closed vats before grinding, and steam is turned on under pressure. This removes most of the fat, gristle and meat. It takes about one and one-half tons of raw bones to make one ton of steamed bones meal.

7. The gristle, fat, etc., in raw bone prevent very fine grinding, and the oily nature of the material prevents it from taking up water very rapidly in the soil, so that the phosphorus in raw bone meal is not as readily available to crops as is that in the less oily, more finely ground steamed bone meal.

8. The meat fragments left behind on the bones also add considerable nitrogen to the bone meals; naturally more to the raw than to the steamed bone. Raw bone meal contains about 10 per cent phosphorus and 2 to 4 per cent nitrogen; steamed bone meal, about 12 to 14 per cent phosphorus and 1 per cent nitrogen. The extra nitrogen in the raw bone meal is an objection rather than an advantage, since the farmer has to pay for it at the market price, about 20 cents per pound which is more than it is usually worth for field crops. For this reason and because the phosphorus is less available in the raw bone meal, steamed bone meal is much the better fertilizer of the two.

9. Phosphorus costs about the same in steamed bone meal as in acid phosphate. A usual application of steamed bone meal is 150 to 300 pounds per acre, though where applied only once during the rotation twice this much should be used. Steamed bone meal, though a good fertilizer, is no better than acid phosphate, and because of its limited supply can be used by only a few farmers.

10. People who make and sell phosphorus fertilizers, instead of saying phosphorus use the term phosphoric acid. There is no reason for this except that it is a custom, though a poor one as some customs are. It will cause no trouble if you remember that one part of phosphorus is equal to 2.3 parts of phosphoric acid. For instance, a fertilizer containing 10

per cent of phosphorus would contain 2.3 times 10, or 23 per cent of phosphoric acid, or if phosphorus is worth 9 cents per pound, phosphoric acid would be worth only 9 divided by 2.3, or a little less than 4 cents per pound.

11. Raw rock phosphate is found in certain places in the earth in much the same way as coal. It is dug out and ground very fine (so that 90 per cent will pass thru a 100-mesh sieve) and put on the market as raw rock phosphate fertilizer, sometimes called floats. Rock phosphate deposits are found in the United States in Florida, South Carolina, Tennessee, Kentucky and in a number of the western states. Most of that used in Kentucky comes from Tennessee.

12. Very naturally the phosphorus in rock phosphate is much cheaper than in bone meal. It costs about 3 cents per pound. The rock phosphate on the market contain about 12 per cent phosphorus. (What per cent phosphoric acid would this be?)

13. Rock phosphate, as you would expect, is only very slowly soluble in water and hence is not very available in soils. It is a very good fertilizer, but must be used in large amounts, not less than one-half ton per acre, once during the rotation, until the supply of phosphorus in the soil is built up.

14. On treating rock phosphate with sulfuric acid, the acid dissolves the rock and makes a material much more soluble than the rock phosphate and hence more available to crops. This material is known as acid-phosphate or sometimes super-phosphate. On being applied to the soil, the phosphorus in the acid-phosphate in a short time largely changes back to the same form as that in the rock phosphate, but not until it has become much better distributed through the soil than it is possible to distribute rock phosphate and hence remains more available to crops. Acid phosphate usually contains about 7 per cent phosphorus and costs about 15 cents per pound of phosphorus. (How much per pound of phosphoric acid?) Where applied only once during the rotation, 300 to 500 pounds of acid phosphate should be used per acre, though half of these amounts will give very good results on a single crop. Very little phosphorus is lost by leaching through the soil and so phosphate can be applied in large amounts to benefit several crops.

15. It is quite a question which is the better to use, acid phosphate or rock phosphate. The rock phosphate is much cheaper, but is less available and must be used in larger amounts per acre. The results from the Kentucky experiment fields outside the Bluegrass region show that when used on unlimed land, rock phosphate is the better, but when used on limed land acid phosphate is the better.

(Continued on page 21)

GROWING NEBRASKA WHEAT AND INCREASING FERTILITY

Homer McKelvie & Sons, Fairfield, Neb., widely known breeders of Poland China hogs, whose father was one of the pioneer breeders of the state and his son was trained from his youth as a breeder and is practical diversified farmer, gives his method in raising wheat as follows:

"We always start plowing just as soon as we can get the crop off the ground, which is from July 10th to 25th. We plow from six to seven inches deep and follow right up with the harrow. Our plowing is mostly done with a 10-20 Titan tractor. The plowing done, we then keep on the watch for volunteer growth, which is eliminated with the tandum disc. Sometimes when the plowing is done very early we are called upon to disc the ground twice before seeding time, and each time it is followed with the harrow. By this means we have our seed bed thoroughly packed below, and enough loose soil on top for the seed. If the season is dry we use the subsurface corrugated land roller. The seed bed prepared and Sept. 15th at hand, we use a 12-hole seven-inch drill to sow the seed, and aim to cover same from one-half to three-fourths inches, and sow from 30 to 55 pounds per acre, depending on the richness of the soil in which we are placing the seed. We use nothing but pure-bred seed, Turkey-Red, until the last three years we have used Kanred. Our average acreage for 28 years has been about 80 acres per year, and twice in that time our average has run as low as 14.5 bushels per acre, but usually it is 28 to 30, and as high as 40. We do not use fertilizer of any kind except that we hog our corn mostly, and the straw is all
threshed in the barn yards, an
all manure is hauled back on th
ground, as high as 500 tons in
single year. Of course you ma
know that to do that we mu
raise and feed considerable stoc
which we do. I wish to say
conclusion, that our soil had bee
poorly farmed before we got th
farm, and was badly run dow
but now it is very fertile, and
getting more so each year. Con
mercial fertilizer is a dream wi
us. Plenty of moisture and su
shine is all we ask." — Hom
McKelvie & Sons, Fairfield, Ne

THE PERIODICAL NEEDE

L. B. Russell, Comanche, Texa
on receiving sample copy
BAYNES' SOIL IMPROVE
writes, "This periodical is som
thing I have wanted for some tim
I enclose check for $1.00 for fi
years, include September and O
tober. I am 74 years old a
initiating a herd of Jersey catt
Hampshire pigs and pure br
poultry farm including turkey
and my soil needs the 'Improver'

A JUST RULE

In Great Britain, when the te
ant supplies bonemeal fertilizer
the soil previous to the expirati
of his lease, he is entitled to co
pensation. The common rate is
lay claim for two-thirds the c
of the bone meal applied the pre
ous year, one-third the cost of th
applied two years previous, a
one-fourth the cost of that appli
three years previous.

It is effective for a long ti
and is a popular fertilizer, but
quires time to get the full bene
from this slowly available pho
phate.

PARTIES FROM MID-WES BUYING WORN OUT FARMS

The Agricultural Departme
has reported from an investig
tion they find that in regions
eastern states where there are
number of abandoned farm
There is some revival of t
movement of farmers from t
middle west to the east to secu
farms with worn out soil at lo
price with a view of buildi
them up in fertility.

Thus securing the benefits
near markets and in some cas
very fair buildings.

BAYNES'
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DITORIALS

WHEAT SURPLUS PERPLEX

The wheat surplus is still perexing the producers. The Nanal Wheat Council held a sesn in Chicago in November, in ich they gave out their opinion at 62,000,000 present acreage anted in wheat was at least ten llion acres too much for domes- requirements. They recommend tting down the wheat acreage d planting other crops.

We imported sixty million pounds butter this season and will need import twenty million bushels flax seed, whch is a crop that ows well in the Northwest spring heat country.

The price of wheat is out of oportion with other farm prodts and the products of other instries which the farmers need to y.

The price of domestic labor was gh and quite fully employed and as well able to pay at a price of 1.50 per bushel for the farmer's heat. In reality the consuming rchaser of wheat bread was not etting the benefit of the low price f wheat.

Had the American Farm Bureau ederation had their National Coerative Wheat Marketing organation at work at beginning of arvest this year, the wheat in the rmer's hands could have been arketed at $1.50 a bushel for home se in all the great cities. The only ecessity would have been a tariff fficient to keep out the Canada heat.

The head of the Co-Ops could have regulated the orderly marketing of the wheat, the consumers all being in condition to gladly pay the price.

The wheat surplus has adjusted itself many times in the past, without our help. The crop failure from drouth, freeze out, or some pest injury might visit us next season and our surplus all be needed. Like when General Lee asked General Longstreet why they did not win at Gettysburg, he replied it was ruled by a Higher Power.

LEGUMES YOUR FRIENDS

Alfalfa, Clover, Soy Beans, and Cows Peas are the farmers' friendly helpers as collectors to gather nitrogen from the air. Their work is scientific and free and pay their own board. Every farmer should cultivate their acquaintance, and number them among their family workers.

DUST THOU ART AND UNTO DUST RETURNETH

We are requested by a subscriber to define what is required to be classed a "Dirt Farmer."

This is a term adopted by farmers who reside upon their farms and feel honored in being real tillers of the soil.

They are thoroughly acquainted with all the different farm work, by training and experience, and join in the labor through the varied changes with the seasons.

The diligent work of seed time and harvest demand different requirements, with which they are fully conversant and equipped for; usually schooled from boyhood up and graduating as homemade original farmers.

They are perfectly at home in the practical caring for the live stock of the farm; either feeding the herds or shearing the flocks, and with few exceptions are disciples of diversified farming.

They believe in progress in a business manner and are open for improvement at all times and to add to their stock of knowledge.

They have lasting faith in the farm as their home and depend upon farming for their living and the education and happiness of their families.

These farmers who have earned the bread that they and their families have eaten by the sweat of their brow, have chosen the appropriate name of "Dirt Farmers" as one to honor and designate their group without reflection on any others of merit.

In Chap. 3-19 Genesis is perhaps our earliest scientific lesson on the soil and its wonderful rotations. "The Lord God said to the first farmer, in the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken; for dust thou art, and unto dust shalt thou return."

TENANTS' OPPORTUNITY

There is in consequence of depletion of cash with some farmers who have obligations to meet who prefer to sell all or a part of their farm to carrying it and paying interest on same, thereby opportunities occur for tenants securing a farm at a reasonable price.

The tenant should be able to grasp the whole subject, and determine just what he would be able to pay from the products of the farm, each year. Then he could settle upon the plan which would be preferable for him. Tenants, if they have the ability to be successful farmers, will nearly always establish a confidence in some man who will assist him with a loan.

The farmer who is now farming on a rented farm who has the ambition to own a farm and become a landholder, will find the time when it is safest to buy is when the prices are low. There are more efforts than to sell, which helps to force the price down.

In 1919 there was a wild speculation in farm lands in certain localities, when parties in some cases bought at unreasonably high figures, really at the peak. A payment was made on it of a few thousand dollars, which was lost with land in many cases.

Be prudent and do not undertake to buy too large a farm and involve yourself with too great a debt.

It will be using better judgment to buy in accordance with your means. Be cautious and consider the transaction from every standpoint. If you act wisely you will find that the time is ripe for tenant farmers who desire to own a farm to purchase. As farms are a good investment which are sure to show a good profit in a few years when bought right, besides furnishing one a home and employment.

The American Farm Bureau

Federation will be an aid to the farmer's interests, which is bound to be a benefit to farmers' business in the future.

THE SOIL DESERVES IT

The marvelous possibilities of the soil should arouse enthusiasm in the breast of every ambitious farmer, young or old, who will concentrate his mind in the study of the soil. Nature's laws govern and control the forming of the soil and its maintenance, and also the plants that grow from the soil.

The soil deserves and demands the closest attention and protection of those who are Mother Earth's caretakers.

The strong, healthy vigorous soil is the foundation of every other industry and business, and the world's greatness rests upon it.

The weak soil must be strengthened by feeding it the food that nature requires for this purpose.

The possibilities of the soil when properly fed and cared for are most wonderful, producing yields of corn, wheat, oats, hay and other crops that more than doubles the general average of the state.

The agricultural colleges and experiment stations by their continuous penetrating researches are constantly adding to the knowledge of the soil and its proper treatment. This learning and experience will benefit farmers and add to their skill.

DIVERSIFIED FARMING

The general farmer fifty years ago in the United States, outside of the cotton belt, was practically a diversified farmer. This plan produced for sale something from the farm at all seasons of the year. While especially the wheat farmer had but one crop to depend on and a failure or a bad drop in the price made it a serious loss.

The general farmer had his dairy product from which there was some calves sold for veal, beside the weekly butter sales. At times there will be some two-year-old fat steers. He would usually have a couple of two-year-old colts for sale during the year.

The hogs have always been noted as money makers, mortgage lifters and taxpayers. They were considered the economical cog on the farm. They could make a gain of 100 lbs. of flesh on just one-half the grain a steer could.

They would glean in the grain fields after harvest and grow and flesh up on the scattered grain. They would eat the fallen fruit and the by-product of the dairy. And any slop and waste garbage from the kitchen. They eat the mast from the acorns and beechnuts and fatten on them. There would be two crops of pigs a year for the pork market.

There would be fed on the farm the greater part of the grain legumes and other hay to the soils' benefit. There will be some wheat and other grain for market. The poultry and eggs count up for the year surprisingly. The rotation of crops is an advantage to the soil. The diversified farmer is better insured in both the surety and amount of his farm receipts and profit. The soil gets its feed quite largely from homemade manure.

TALK ABOUT THE FARMER

Dr. Hubert Work, Secretary of Interior, says: "Back to the Soil, is the slogan. Food, shelter and sleep comprise human necessities —all else are luxuries. Provide the two first and the third follows free." He offers encouragement to the farmer in the outlook of the future.

Ex-Governor Frank O. Lowden, chairman of the executive board of organization of the National Wheat Growers' Advisory Association, approves the western trip work of Mr. Meyer and Mr. Mondell of the War Finance Corporation in advocating methods of self help through efficient production and co-operative marketing of crops, as an invaluable service for American agriculture and for the aims embodied in this committee.

Senator Arthur Capper, in his Great Farm Weekly, says the farmer's dollar should be made good by a fairer relationship between the prices the farmer receives and the prices he pays for everything he buys, is imperative. His dollar must be brought up to the general level in buying power and made as good as any one else's dollar. To lessen this economic inequality the spread must still further be reduced between producer and consumer. The farmer is helping himself throu
co-operative marketing, diver
fied farming and strict econon

The city bread eater says t
price of bread from the baker h
not dropped with the low pr
of wheat, and the middlem
must be the only one benefited.

H. C. Wallace, Secretary
Agriculture, reports the value
11 of the principal crops grov
in 1923 are $7,000,000,000, co
pared with 1921 were $5,200,00
000, an increase of $1,800,000,0
That sounds helpful, but who h
the money?

BRIGHTER HEADLIGHT INDICATE IMPROVEMENT

Eugene Meyer, Jr., managing
rector of the War Finance Co
poration, who has made an inves
gation of the agricultural conditi
across the continent, reports th
the wheat farmer and live sto
growers' condition is steadily ir
proving.

The fruit grower and dairym
and the great majority of divers
fied farmers are in best conditi
since the deflation period. It
further quoted as a betterment
the farmers' condition the repa
ment this year of about 100 milli
dollars loaned on farm credits la
year.

Elbert H. Gary and Charl
Schwab, two sound, successf
business men, who have the con
dence of the people, and their jud
ment covers the whole countr
They both announce their firm b
lief in our approaching an era
prosperity and the fundament
soundness of American prosperit
the bright hope for the future an
the only necessity is confidence an
energy to reach greater industri
and commercial success.

The agricultural colleges an
experiment stations are studyin
investigating and researching i
the agricultural line. Then tes
ing, producing and proving b
practical results in the advance
ment of agricultural science.

Next the county agent and ad
viser, administers this knowledg
to the farms of his county, mak
ing it available for assimilatior

Thus putting the greatest an
most necessary industry of th
country on a high plane of ad
vancement.

FACTS ON WINTER FEEDING

The winter feeding of cattle has ny things to commend it; for it nishes a market for grain and y shortly after they are produced, and it is accomplished at a son when other farm work is t rushing. This and the sucding paragraphs are some of the tstanding statements in a radio k broadcast from Jefferson City, ednesday night, by E. A. Trowdge, head of the department of imal husbandry at the Missouri llege of Agriculture.

Only one-fourth as much land is quired to grow silage for fatten- a steer on full feed as that reired to grow pasture for a full- steer making the same gain.

The manure produced in a dry feeding can be applied to fields ere it can be plowed under and lized to best advantage.

A ton of grain fed to cattle and iven from the farm removes only e-fifth as much fertility as when uled from the farm for sale on e grain market.

Considering the speculative ase of cattle feeding it is well to member that the chance for a ort heavy feed on big cattle may rry with it a chance not only r big profits but also for big sses.

Two-year-old cattle fed in a dry 143 days at the Missouri Exriment Station in 1922 gained 31 pounds daily or a total of 471 unds per head. For every 100 unds of gain these cattle ate 568 unds of shelled corn, 97 pounds linseed oil cake, 64 pounds of falfa hay, and 420 pounds of age.

For every 100 pounds of gain on e cattle the hogs following them ade a gain of 16 pounds.

The past few years have seen a eat increase in the fattening of lves. Really fat steers, weighing 0 to 1,000 pounds have found a ore ready market during the past o or three years prior to that ne.

It has been found that the same antity of beef produced on 3-ar olds by 100 pounds of feed ill be produced on 2-year olds by to 95 pounds of feed, on yearngs by 75 to 80 pounds, and on lves by 60 pounds. Younger ttle also gain at a higher rate an older cattle.

Older cattle, on the other hand, n be put in marketable condition in the shortest feeding period. Baby beef production is a long, slow process, and for quick returns bigger steers may answer better.

There is somewhat greater chance for loss among younger cattle, and they require somewhat more skill and attention than older cattle.

A good shed open to the south located on high ground, furnishes ample shelter for fattening steers. Too close confinement and poor ventilation decrease the rapidity and economy of gains.

Work at the Missouri Experiment Station indicates that with hogs following cattle it does not pay to grind the corn.

BUCKWHEAT CAKES

We have a subscriber with whom buckwheat cakes are especial favorites, who is anxious to understand just how to produce the buckwheat. If some of our readers who are familiar with growing buckwheat will send in the instruction, preparing the soil, how much seed to the acre; he only expects to seed three or four acres.

About the right time to sow, in central Indiana, and fertilizer, if any used, etc., etc. The giver may be helping some other lover of buckwheat cakes.

Uses. — Buckwheat is a good weed fighter and can be used as a smother crop because it makes such a rapid growth. It is also a satisfactory green manure crop, although it does not possess the advantage of a legume in being able to fix atmospheric nitrogen. The grain has fair feeding value but is somewhat lower in total nutrients than are the leading cereals. The grain is used for chicken and hog feed. In the United States buckwheat cakes are considered a delicacy by many people.

Character of the Plant.—Buckwheat is an erect growing plant. It lives one season only. A single stem is produced from each seed. The plants vary in height from two to three feet.

Climatic and Soil Requirements. — Buckwheat is sensitive to cold and is easily killed by freezing weather. Neither will this crop thrive well under high temperature. The period between blooming and maturity of the grain is the critical time in the life of the plant. If hot weather comes on during this period, the grain yield will be materially reduced.

Buckwheat does better on poor soil than almost any other crop, although it responds to good soil and good cultivation. It is interesting to note that buckwheat will produce greater returns from acid soils than do the common corn belt crops. Soils containing large supplies of nitrogen are not well suited to buckwheat because of the tendency of the plant to lodge.

Varieties.—Three varieties of buckwheat are grown rather extensively in the United States. These are the Japanese, the Common Gray, and the Silver Hull. Probably the Japanese is the most commonly grown of the kinds mentioned.

Seeding. — The seed bed for buckwheat is prepared in the same manner as the seed bed for most of the ordinary crops. It is best to plow in the fall or very early spring. The land should be kept clean until seeding time.

Since buckwheat is sensitive to cold it should not be planted until danger of frost or freezing weather is passed. The crop may be seeded soon after corn planting and as late as the middle of June. The time required for maturing is 80 to 85 days.

As a rule, the rate of seeding varies from three to five pecks per acre. A common method of seeding is by broadcasting and then harrowing the seed in. Where there is a drill on the farm, it should, of course, be used in preference to broadcasting. It is best to plant the seed about the same depth as corn, or slightly shallower.

Harvesting and Threshing. — Harvesting should begin about the time the first seeds are mature. The binder is the best implement for harvesting this crop. It is desirable to cut early in the morning when the dew is on, or during the moist weather. Buckwheat is usually left in the shock until threshed. The common threshing machine can be adjusted for handling buckwheat by removing the concaves and substituting a smooth board. By this method the seed can be easily threshed without cracking it badly. — Dept. of Agriculture, University of Illinois.

ILLINOIS SYSTEM OF PERMANENT SOIL FERTILITY

The address of Dr. Robert Stewart, Chief in Soil Fertility, in his address in 1920 on the Illinois System of Permanent Soil Fertility as developed by Dr. Cyril G. Hopkins, made clear that the basis of this system was: Adding to the land somewhat larger amount of fertility than was removed from the land by cropping and by natural causes; and the recognition of the economic necessity of employing for this purpose the cheapest available materials, attention being confined for the most part to the limiting element in the particular soil in question. Introductory note by E. Davenport, director.

Sixty years ago Liebig, the great agricultural chemist, made the following statement: "Agriculture is, of all industrial pursuits, the richest in facts, and the poorest in their comprehension. Facts are like grains of sand which are moved by the wind, but principles are these same grains cemented into rocks." The great contribution made by the late Dr. Cyril G. Hopkins was the gathering together, studying, interpreting, classifying, and unifying of the known facts of agriculture, into a definite whole as practiced and taught by him in the "Illinois System of Permanent Soil Fertility."

Many of the facts upon which the Illinois system is based have been known for years and even centries, and have been developed by other men and other institutions and in other times. It remained, however, for Doctor Hopkins to bring together and to unify these isolated facts into a definite, workable system and by his own investigations to demonstrate clearly that the system could be understood and used by the average farmer on his own fields with very profitable and satisfactory results. In his interpretation of the facts upon which the system is based all men have not agreed, and some even still do not agree with him. But the system rests on the sure foundation of facts supported by an abundance of experimental data now available from the fields and laboratories operated under his direction.

The Factors of Crop Production: The Illinois system of permanent soil fertility recognizes six positive factors of crop production. These factors may be designated briefly, as: (1) Seed; (2) moisture; (3) light; (4) heat; (5) home for the plant, and (6) food for its use. No one factor of crop production is any more essential than any other, but it is clearly realized that certain factors are more often the limiting ones in production, and furthermore that some factors are more easily brought under the control of the farmer. There are, of course, certain negative factors, such as insect pests, plant diseases, etc., which at times materially limit the production of crops and which must be considered after attention has been given to the removal of the limitations having to do with the positive factors of crop production.

The system recognizes the importance and absolute necessity of good seed. Good seed is influenced by variety, vitality, selection, and breeding. The effectiveness of selection and breeding as a means of improving crops is well illustrated by the well-known experiments in the selection of high- and low-protein and high- and low-oil seed corn carried on by the Illinois Experiment Station.

Moisture is a factor of crop production which is often the limiting one, and in certain areas, as in a semi-arid region, may be largely controlled by irrigation or by dry farming. In humid areas, however, this factor cannot be economically controlled to any great extent, although the farmer has at his command a few operations which may assist somewhat during a period of temporary drough. A soil which is well supplied with organic matter and kept free from weeds will resist the effect of drouth better than one not so well supplied. This is well illustrated by the data from the Broadbalk field at Rothamsted, England. The 55-year average yield of wheat from Plot 2, receiving farm manure, is 35.5 bushels; while that of Plot 8, receiving minerals and nitrogen, is 37.1 bushels. In the year 1893, however, which was an extremely dry year, the yield of wheat from Plot 2 was 34.3 bushels, while the yield from Plot 8 was only 21.8 bushels. The effect the lack of moisture in a hum area may be partially overcon by a soil well supplied with o ganic matter and free from weed

The light factor is very impo tant but is largely beyond t control of the farmer. Wheat oats which are grown as a nur crop may be planted in rows ru ning north and south in ord that the young crop of clove beans, cowpeas, or alfalfa ma receive the full benefit of t sun's rays during mid-day, whe they are strongest. Fortunatel the light falling on an acre ground is more than sufficient f the maximum production crops, and this factor probab never limits the yields of crop

The heat factor likewise largely beyond the control of t farmer, although a few thing may be done to modify in a ver minor degree the effect of th factor. A well-drained soil we suppiled with organic matter, a few degrees warmer than a so not well drained or supplied wit organic matter; and farm cro must always be grown in t time of year when the temper ture conditions are favorable.

It is essential to recognize th the soil is the home of the pla in which its roots find a foothol and in which it obtains a certa portion of its food. As with t home of man so with the hom of the plant, it must be kept i a sanitary condition and we supplied with food so that no mal deevlopment may take plac The home of the plant must b kept aerated by cultivation, an it must be kept porous and friabl by being well supplied with o ganic matter and limestone. Ther are certain limits, however, be yond which the physical cond tions of the soil cannot be ec nomically changed. A sandy so must remain sand and a clay so must remain heavy and compac but certain treatment can b made to modify these condition in a limited degree. Soil which i water-logged must be draine and soil which is acid must b treated with limestone in orde to neutralize the acidity. In thi manner the soil as the home o the plant mav be materially mod ified.—University of Illinois Ag ricultural Experiment Station.

(Continued in January issue.

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BAYNES' SOIL IMPROVER

327 So. La Salle St., Chicago, Ill.

COUNTY AGRICULTURAL ADVISERS' DEPARTMENT

For exchanges on ideas on operating office, and relating successes and matters of interest for discussion
It's free to you. Use it freely for your interests

FAITH IN COUNTY AGENT

We have always had great faith in the County Agent as the farmer's most valued adviser, useful instructor and practical helper in the county. As editor of the American Swineherd, upon the appointment of the first County Agent, announced it as one of the most important moves for the farmer's benefit made in this century. The County Agent is growing more valuable each year in developing and enlarging his work for the farmer. Of course, this presumes a qualified person is selected.

We believe the County Agent could use a page or two each month of "BAYNES' SOIL IMPROVER" as an aid in their work, to the further development and improvement in the operation of their office and such matters of interest to them. We believe in giving them the freedom of one or two pages a month for their use, we would be serving the farmer's interests. We would also take pleasure in having reports of farmers who had made a success in taking hold of a wornout farm and mending it, till it became a productive farm, with the details of how it was done. And any report for the advancement of the farmer's cause. Boys, why not let us get together in this work. You that are making a hit, let your comrade know about it; you will be benefiting agriculture. We would credit the agent for reports, etc., as being on exchange list. Let us hear from those who would appreciate this.

COUNTY AGENT WORK

E. T. Itchner, County Agent, Jefferson County, Missouri, is entitled to much credit for his work in training Jack Cornell, a bright, active, enterprising boy of his county to qualify him for practical work in judging contest of the National Dairy Show at Syracuse, New York.

In this field of sixty individual contestants representing twenty states, Jackson Cornell was placed third in judging all breeds and two medals.

His team included his brother, Adalbert and another Jefferson County boy, Lloyd Huskey, placed ninth among twenty teams.

The remarkable record made at Syracuse by the boy from this modest home in the Missouri hills was not an accident. The boy has been training for this contest since the 10th of May. In order to compete in the National Show at Syracuse he had first to win a place on the Jefferson County team in competition with members of the seven dairy calf clubs organized last spring by County Agent Itschner. Having made sure of a place on his county team he had next to prepare for a much harder contest at the State Fair where he and his team mates defeated all other contenders among the dairy calf club teams of the entire state.

All this time the boy and his team mates were being trained by County Agent Itschner in accordance with the plan of the Agricultural Extension Service, the purpose of which is to carry agricultural instruction out to Missouri farms regardless of their distance from the College.

When the date of the National contest drew near, the Extension Service sent E. M. Marmon, dairy specialist, as an additional coach and both Harmon and Itschner accompanied the team to Syracuse. The trip was made by automobile with stops at the leading dairy herds and at the agricultural colleges of Indiana, Ohio, Pennsylvania and New York.

The medals won by Jackson Cornell are but incidentals in the year's work among the dairy calf clubs of Missouri. Systematic instructions in the selection, feeding and care of the dairy calf has been given by representatives of the Agricultural Extension Service to 137 dairy calf club members. These boys and girls have been constantly under instruction since last spring and have learned lessons of permanent value by actually caring for dairy calves of their own. The useful knowledge thus gained will be a lasting benefit and an influence for good in all the farm homes thus reached by the Extension Service.

SOIL FERTILITY PR GRAMS WIN HIGH HONORS

Six county agents in vario
parts of the United States ha
been awarded high honors by
committee of agriculturists for so
fertility programs this year. T
winners have been awarded dipl
mas certifying their work, and ha
been given a trip to Chicago whe
they will attend the annual mee
ing of the American Society
Agronomy.

The county agents winning th
distinction are F. R. Churchi
Middlebury, Vermont; R. E. W
son, Dover, Delaware; C. F. Cla
Lebanon, Ohio; R. E. Gwin, C
lumbus, Kansas; E. C. Rot
Brainard, Minnesota, and Walt
F. Gahn, Portsmouth, Ohio.

Walter F. Gahn, whose wo
received the highest ranking, h
been accorded the distinction of
place upon the Society's progra

The committee of judges wh
passed on the soil-fertility pr
gram of the county agents we
Professor Bear, Ohio State Un
versity; Dr. A. G. McCall, Unive
sity of Maryland; S. B. Haske
Massachusetts Experimental St
tion; Professor M. F. Miller, Un
versity of Missouri.

COUNTY AGENT WINS PROMOTION

Twenty-seven months of har
work as extension agent
McDonald County has won prom
tion for R. L. Furry, who graduate
from the Missouri College of Agri
culture in 1919. When Furry wa
sent to the southwest corner of th
state as county agent, July 1, 192
a great many persons said it was im
possible for county agent work
succeed in a county having only te
miles of railroad and extremel
poor wagon roads, a stony soil, an
a mountainous topography.

But Furry had not been educate
for a white-collar job; he put on
blue shirt and a pair of bib-over
alls and went to work. He buil
a model of the Missouri poultr
house and mounted it on the rea
end of his runabout. He got to
gether some samples of the poultr
feeds that get maximum egg pro
duction. Then he went out amon
the members of his county farm
bureau and showed them how t
cull their hens to get rid of th
loafers, how to build the right kin
of a poultry house from the most

adily available material, and how get full benefit from their home-own feeds by adding the right ount of tankage, etc. In this y he helped his farmers build new poultry houses in 27 nths and to remodel as many re. In the first year he ineased the sale of tankage for ultry feed in his county from $40 $1,600; and by so doing ineased the egg production of the nty $31,000.

With equal energy he demonated correct practices with dairy ws, and boosted the Clover and osperity campaign for the improvement of the soil and the me-grown feed supply.

And now he has been appointed trict extension agent by the llege of Agriculture to work oughout Southwest Missouri th headquarters at Bolivar

Mo Clip Sheet.

APPROVES THE PLAN

Upon submitting our offer to unty Agricultural Agent Rusl E. Wilson of Kent county, laware, who was one of six county agents who re selected to attend the anal meeting of the American ciety of Agronomy in Chicago s fall. The awards were made the basis of the six best ferity programs, of which group winners Mr. Wilson was one.

Mr. Wilson writes: Replying your letter with reference to ur publishing articles regarding the activities of county agents in the United States.

I am in sympathy with your plan, and I feel confident that many county agents will take advantage of this opportunity to give the other agents some ideas of how they are carrying on the work in their respective counties. In the near future I will give your company an article pertaining to the work in Kent county, Delaware, where I have been county agent for two years.

A WIDER USE OF SOYBEANS

Soybeans are rapidly gaining in popularity throughout the Corn Belt. Reports from 21 Ohio counties show in one year a 50 per cent increase in the soybean acreage. Farmers near Toledo, working with a local seed and oil company, will raise soybeans for oil next year, utilizing the partially cooked soybean meal, a by-product of extraction, as a concentrated protein feed for cows.

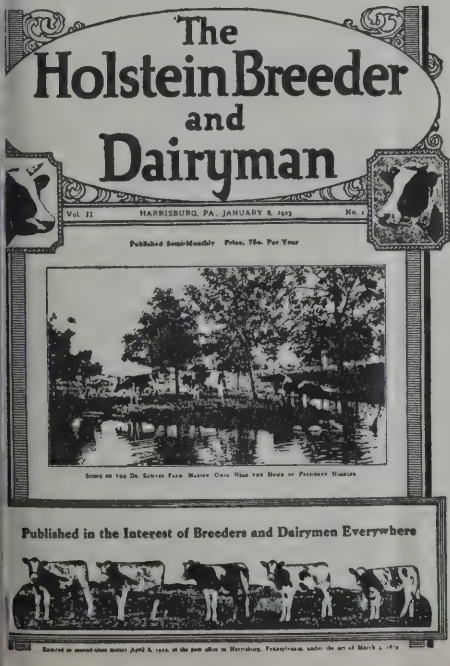
BILL NYE'S COW COPY

Bill Nye, the humorist, once had a cow he wanted to sell and he unblushingly advertised all her faults while naming the few virtues she seems to have possessed. His advertisement ran:

"Owing to my ill health, I will sell at my residence in township 19, range 18, according to the government's survey, one plush raspberry cow, age 8 years. She is of undoubted courage and gives milk freely. To the man who does not fear death in any form, she would be a great boon. She is very much attached to her present home with a stay chain, but she will be sold to anyone who will agree to treat her right. She is one-fourth Shorthorn and three-quarters hyena. I will also throw in a double barrel shotgun which goes with her. In May she usually goes away for a week or two and returns with a tall red calf with wobbly legs. Her name is Rose. I would rather sell her to a non-resident, the farther away the better."—Idaho University.

Some farmers who have objected to the high prices of bran and shipstuff should grow a substitute better than these. It has been shown by farmers who have practiced for years planting about six grains of sweet corn in the hill and when it was about ready to tassel cut it up and shock it so it will cure and when well cured it can be housed. Fed to the milk cows the butter will have the rich color that first spring pasture gives it. It makes an excellent feed when first cut for the cows to produce butter. It is easily and cheaply grown, while a couple of acres will make a lot of feed.

Turn to Page Two for
Christmas Gifts



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RESULTS IN FERTILIZING CROPS ON SWEET CLOVER

There are few farmers who would ask for any more ideal fertilizing agent than plenty of manure properly supplemented with acid phosphate. Unfortunately few farms produce enough manure for maximum crop production. Sweet clover forms an admirable substitute. Making a larger growth during the two years of its life than red clover or alfalfa will make in the same length of time, sweet clover must be considered without a peer as a gatherer of atmospheric nitrogen. As an average for nine experimental fields the Illinois Station reports a combined fall and spring growth of sweet clover up until about May 1, the date of plowing down for corn, of 9 tons of green material per acre. This contained 3,200 pounds of dry matter and 135 pounds of nitrogen. Later investigations have shown that at this stage the roots of the crop contain almost equal amounts of both organic matter and nitrogen. Thus the plowing down of a good crop of sweet clover at this time may be expected to add over three tons of dry organic matter, equal to the quantity contained in 12 tons of manure and to supply 270 pounds of nitrogen equal to that contained in 25 tons of manure. When it is considered that such a crop contains phosphoric acid equal to 200 pounds of 16 per cent acid phosphate, besides large amounts of potash, lime and magnesia, it is not surprising that phenomenal results are often observed on the following crops of the rotation.

Sweet clover residues are exceptionally rapid in their rate of decay in the soil, ranking in this respect more with high grade organic fertilizers than with most crop residues or even stable manure. Chemical determinations on four corn fields in Illinois in which sweet clover as a green manure was compared with applications of stable manure averaging nine tons per acre showed that the sweet clover plots maintained a nitrate nitrogen content in the soil three times as great as the manure plots during the time the corn crop was making its most rapid growth.

What Sweet Clover Does to the Soil.—The habit of growth whereby sweet clover send its fleshy, branching roots three feet and more into the soil, piercing hard pan layers or tight clay subsoils, is not the least of its advantages. On many lands in the corn belt where years of farming to shallow rooted crops has lead to the intensification of these conditions, drainage often becomes impaired even though the land is well tiled. Often marked improvement is noted in the drainage of these heavy soils after two or three crops of sweet clover have been grown. This is due no doubt to the drainage channels left by the decay of the roots which have penetrated the subsoil. Sweet clover roots will not penetrate far into an acid subsoil no matter how well the surface may be supplied with limestone. Fortunately, most of the soils in Western Ohio, that section of the state to which the crop is best adapted, have subsoils which are well supplied with carbonate of lime.

E. P. REED.
Dept. of Soils, Ohio University.

EFFORTS OF EXPERIMENT STATIONS TO FIND WAYS TO PROVIDE FOR OUR PEOPLE

By Professor C. A. Olson

The activities of experiment station men are largely directed to problems relating to production. These studies involve selection of varieties, methods of handling or treating soils and search for factors which contribute to differences in growth as observed in various localities.

Through selection and introduction of new varieties, plants hardier than the native ones are frequently found which increase the yields or resist disease. Frequently they are early maturing varieties which escape drought or frost.

Through plowing and cultivating increased supplies of available food are provided plants and ways of conserving this food and moisture are developed. The introduction of organic matter frequently facilitates the condition of the soil and aids in increasing the solubility of minerals. Some of the lowest forms of life are favored and among the bacteria each kind performs its share in bringing about some change generally contributing to increased production.

Whether or not plants growing luxuriantly are able to appropriate minerals of varying degrees of solubility better than less promising ones remains an open question. It is likely that the differences not
in growth are independent of fun
tion of utilizing mineral constit
ents. Under such circumstanc
it is probable that one variety a
propriates as much food as anoth
but they differ in required time
utilizing the food in the comple
cycle of growth.

In this connection it is reco
nized that plants show differe
degrees of tolerance, largely infl
enced through variations in s
composition. Probably there a
some kind of plant compared wi
another. Roots which develop a
feed close to the surface are i
bedded in a soil of an entirely di
ferent soil composition than roo
which penetrate and grow free
in subsoil.

Both Chemical and physic
analysis show differences in natu
of surface soil compared with su
soil. The surface soil is rich
organic matter and physically di
ferent from that of the subso
There are other differences easi
discernible, Invisible differenc
also are present which a
ascertained by means of chemic
and the microscope.

Gradually the various metho
of increasing production are i
proved. In one branch of resear
men are specializing with varieti
while in another branch attenti
is devoted to methods of s
management, etc. Undoubtedly
the course of time considerable
tention will be given to methods
utilizing various minerals. Up
the present time the work in t
field of research has been very
stricted. The Illinois Experime
Station has studied various met
ods of making use of rock pho
phate with the view of using
as a source of phosphorous f
plants. At the Oregon and Was
ington Experiment Stations ca
fully worked out methods sho
that sulphate sulphur is a far mo
important factor in crop produ
tion than was formerly suppose
A review of data submitted by E
periment Stations show many i
stances where sulphate sulphur h
been and is at least partly respon
ble for increased yields.

The most important feature
the western experiments is that i
creases of one ton or more of h
have resulted following the use
elemental sulphur or in the imm
diately available form of sulpha
sulphur. Increases have also be
obtained with acid phosphate b
these increases have not been

arked as those noted when gyp- im is used alone.

Another interesting feature per- ining to the western experiments the study of the duration of the plication. This kind of infor- ation is desired because it may ean much in the way of know- g how often a given quantity of essential plant food will have be applied to continue getting aximum production. The dura- on of a 300 pound per acre appli- ation of land plaster to increase e yield of alfalfa two tons an- ually is three years. It requires bout 600 pounds of acid phosphate produce nearly the same results nd the increase is due to the sul- hate sulphur contained in the cid phosphate.

A very interesting experiment onducted by Suzulci in Japan hows a combination of bone dust nd gypsum to be less effective in he production of rice seed than odium phosphate or bone dust lone. The utilization of a com- ination of sodium phosphate and small quantity of calcium car- onate (limestone) increases the ield nearly two and one-half imes while a combination of the ame phosphate with a large mount of calcium carbonate de- reases the yield in amount less han is obtained in case of check. combination of a large amount f land plaster with sodium phos- hate increases the yield of rice eed three and one-half times that btained in case of check.

The soil used in the experiment ontained 11 per cent humus and xcessive liming according to Zu- uki depressed the yield very much otwithstanding the fact that phos- horous was in the easily available form. Gypsum, on the other hand, n equivalent quantities, under therwise similar conditions led to greatest production of seed. Here was depressed assimilability and not depressed availability where large quantities of calcium carbonate were used.

In fact, there are many experiments which show differences due to nature and combination of essential elements of plant food but less attention has been given to this kind of study than that relating to selection of plants or methods of handling soils.

A recent inuiry sent to experiment stations showed that practically nothing concerning the possibilities of using combinations of rock phosphate and gypsum in place of acid phosphate had been considered. However, the Oregon and Washington experiments and rock phosphate and manure experiments conducted at various places have suggested the feasibility of using such combinations. There are farmers who have tried out the combination of finely ground gypsum and rock phosphate on oats and corn and 80 bushels of corn per acre is certainly a very good yield.

There are many problems to be solved and no doubt in time the efforts of experiment station men will expand. The result obtained will be carried to the farmers and better ways of farming will ensue.

ORDERLY MARKETING

The United States wheat crop for the year's use of our people is harvested in a period of about three weeks, thus it is largely ready for market as threshed.

This causes a disorderly market usually, as each farmer is governed only by his desire to cash his crop.

It is the crowding of wheat on the market that bears the price to the farmer's injury. It is is largely sold through the co-operative marketing department of the American Farm Bureau Federation, it can be controlled and made orderly, which means better prices.

If it had been in full operation this year the price of wheat could have been made by the producers $1.50 a bushel, instead of allowing the two hundred million surplus control the price of the five hundred million bushels for our use.

NOT GROWING ENOUGH FLAXSEED

The United States is producing less than one-third of the flaxseed it needs. It produced only 11,700,000 bushels in 1922, and the estimated production of 19,400,000 bushels for this year will still be less than 50 per cent of this country's requirements. Our principal source of flaxseed is Argentine. The U. S. Department of Agriculture is considering the possibility of increasing the acreage of flax through shifting from wheat and other crops. One drawback to growing more flaxseed in the grower's opinion is that it is hard on the soil.

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HOGS SOIL IMPROVERS

The question of keeping up the fertility of the soil of our farms is one that is receiving more attention than heretofore. There can be no really good farming where one does not arrange his crops, and select animals to be kept on the farm, that in the end the soil will be better for having produced the crop and carried the animals.

That the profits from even the animals kept on the farm, the soil of which is made better year by year, are greater than is possible from growing crops and hauling them from the farm to the market, is conceded by men who have given most attention to test farming.

Altho the vast amount of nitrogen, phosphorous and potash, that is represented in our crops of corn, wheat, oats, etc., may be sold and their equivalent return in commercial fertilizers, we are still failing to do as well by our soils, as we can do by feeding the corn and oats and bring back all the middlings and bran made from our wheat. To make the best use of all the forage and grains grown on our farms, we need more than hogs. We need sheep and cattle to consume the hay, straw and fodder, since the forage from our fields of corn and hay fed to cattle, horses and sheep always return a profit for feed consumed. In keeping before us the betterment of soil as well as the improvement of our animals, it is clear we must arrange to feed not only corn but also the forage the farm may produce, supplemented with the byproducts of the mills. As a soil improver, the hog holds a high rank. The forage plant that is most in favor with hogs is alfalfa, clover and the legumes and combined with corn, oats, barley, peas, is not only very profitable at the same time is a builder up of the fertility and improvement of the soil.

The time has come when only the reckless can ignore the problem of keeping up and increasing the fertility. We can approach this by hogs, where there is plenty of grazing, as many months in the year as possible. The fact that in the South hogs can graze, in some places, the year around and hogdown the corn, root out the peanuts, sweet potatoes and other tubers, tells the possibility of cheap pork and fertile soil.—Old Timer.

MISSOURI SHOWN YOU IN PARAGRAPHS

The progressive and thoroughly efficient enterprising secretary of Missouri State Board of Agriculture, Jewell Mayes, is continually adding some new feature to his work to exploit the wonders and greatness of his state.

His latest achievement is a bulletin on "Missouri in Paragraphs." It surely dresses his state up that he serves so loyally, in the latest style of glittering pearls, that are real statistical facts. It will awaken a new pride for his state in every Missourian who reads it.

The outsider cannot resist admiring it and congratulate the Board of Agriculture upon the ability of their secretary to introduce the state arrayed so attractively.

As a few sample paragraphs from this great voluminous 42-page bulletin, we submit the following for which there will undoubtedly be a great demand for. It is an agricultural encyclopedia of Missouri.

Missouri in Paragraphs

Missouri is eighteenth in land area.

There are 14,816 silos in Missouri.

Missouri is first in diversified farming.

Missouri is "The State of Diversified Plenty."

Missouri in 1922 was nineteenth in production of rye.

Missouri was second in acre-yield of rice in 1920.

Missouri is the land of fruits, poultry and livestock.

Missouri, the Corn State

Missouri is "The Fifth State."

Missouri is truly a "Corn State."

Missouri is a greater corn state than Kansas.

Missouri grows more than twice as much wheat as Iowa.

Missouri on the average grows more corn than any European country.

Missouri in 1919 produced more corn than 23 other states combined.

Corn is King in Missouri, being God's greatest agricultural gift to America.

Missouri grows corn at less cost per acre and per bushel than any other corn state.

Missouri grows more corn annually than the average of any foreign nation in the world.

Missouri on the average grow more corn annually than the entire country of Argentina, South America.

Five Missouri counties grow a much corn on the average as th entire Dominion of Canada.

Half the counties in Missour grow more corn than any one o half the states of the Union.

Missouri, Fourth in Wheat

Missouri is a soft-red winte wheat state.

Missouri does not go broke when wheat sells low.

Missouri's finances do not hang on wheat or any other one crop.

Missouri in 1923 is temporarily the "Third Wheat State," next after Kansas and Illinois.

Missouri grows the soft wheat that makes the best flour for baking biscuits and pastry.

Missourians have made the greatest fame for their home state in the eras when they have most largely used Missouri grown-milled soft wheat flour.

PRACTICAL CONSTRUCTIVE ROTATIONS

Some farmers in the level sections of Northwestern Ohio have become discouraged in growing winter wheat, because of its liability to winter kill.

Their difficulties, however, may be mostly overcome by better methods of soil management. The seedbed must be prepared earlier than common so that it can be well settled, and seeding must be done more nearly on time, so that the wheat has a good growth before going into the winter. Much of the winter killing is also due to insufficient drainage, calling in some cases for more tile, but especially for a loosening up of the subsoil by the use of a deep-rooted crop. With spring wheat the things to be emphasized are early seeding and plenty of fertility. The former usually means fall or winter plowing, unless the land can readily be worked into good condition without plowing. With the best soil management it is doubtful whether spring wheat is any more subject to the whims of the season than winter wheat.

Three or Four-Year Rotation?—It may be pointed out that these four-year rotations are better as a rule for the land than the common corn-wheat-clover or corn-oats-clover rotations. The ur-year plans give a larger pro- ortion of clover. No doubt some ill prefer the three-year rota- ons for the sake of growing rn more frequently. On many rms the same thing can be ac- mplished by a combination of four-year and two-year rotation corn-wheat with clover as a tch crop.

Corn-Wheat. — Certain deep, rtile soils, fairly well stocked ith humus, can undoubtedly be aintained at a high level of fer- lity with a rotation of this kind. weet clover or mammoth clover n be seeded with wheat and owed under for corn and the heat straw returned to the land. the clover is cut for hay, or astured, and the corn fed, man- re should be available at the te of six to eight tons per acre ch rotation. Under these con- tions this rotation may be used building up a soil of medium rtility.

Mr. Richard Pasher of Union ounty employs this system, and astures his sweet clover during e fall. In August, 1917, he was asturing 12 cows and 30 pigs on acres of sweet clover growing wheat stubble. He was sure at his corn crops were better ch time they occurred in this tation. This is apparently be- oming a popular rotation with ose who have learned the uickness with which sweet over functions in soil improve- ent.

Soybeans-Wheat-Clover. — For se on parts of many farms on hich the soil is below medium rtility, this scheme proves an specially acceptable one. Ad- antage is being taken of this ro- tion to an increasing extent in astern and southeastern Ohio, here its merits are especially ppreciated. With fair use of lime nd phosphorus, the soybean eed, wheat grain and straw, and ne clover crop may be sold with ood prospects for the soil be- oming better each rotation. If heat grain only is sold, the re- ainder of the produce being fed r used in the stable and the anure returned in proportion to ne crops grown, somewhat more apid improvement would be ef- ected.

Starting at the Bottom.—For ne who finds himself on a farm ow in fertility, and with little apital for equipment or stock, ne soybeans-wheat-clover rota- on offers a very practical means getting under way. By using 200 pounds per acre of acid phosphate and with inoculation, soybeans should make a fair crop on rather thin soil without the use of lime. According to some of the Ohio Experiment Station results, wheat following soybeans has averaged 10 bushels better than wheat following corn. A little more acid phosphate, then, will make a good wheat crop. At least a few acres can be limed by this time and that much will be ready for clover. The unlimed wheat ground, if any, can be put into soybeans again and by that time enough of a start may have been made to buy more limestone.

Wheat-Clover. — This rotation will be found very desirable on some part of any farm where a rapid means of soil improvement is needed. It is suggested with particular reference to southeastern Ohio. Wheat can be made a profitable crop on thousands of acres of what are now run-out hill pastures, some of which are really too steep for cultivated crops because of trouble from washing. If these thin pastures or meadows are plowed in July or August and well limed and phosphated, they will grow a good crop of wheat and a successful crop of clover. Sweet clover is the crop that will do best under these conditions and that will work for most rapid soil improvement. After it has been grown once, almost any other clover will do well. In fact, farmers have demonstrated that alfalfa is altogether possible after sweet clover. On hill pasture land on the Mary Bannon farm in Scioto County last year, a yield of more than 30 bushels of wheat per acre was secured on 30 acres. Following this rather successful yield, 120 acres on the same farm were sowed to wheat last fall. In the past few weeks sweet clover has been seeded in all of this wheat.—Joseph F. Barker, Department of Soil, Ohio State University.

FARM IMPLEMENTS AND MACHINERY

The farm implement and machinery equipments, are labor saving devices that are a wonderful relief to the farmers, in these times when labor is not only scarce but costly. There is such a multiplicity of them that it is difficult to find a thing to be done on the farm, that there is not an implement or machine to do it with. From milking cows, up to the greatest drudgery and difficult work of skill, that caused the sweat of the farmer's brow, is furnished by the tireless motor power. The progressive labor reinforcement to the agriculturist enables the American Farmer to lead the world in this line.

Turn to page 2 for your Christmas Gifts and how to supply them.

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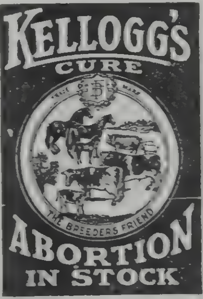

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RESTORED FARM'S CREDIT LEGUMES-STABLE MANURE

It will make any young chap quite proud to take possession of a farm that is run down at the heel, so far as crop yields are concerned, and in three years have your neighbors credit you with being a good farmer.

With a work team of two good mares, six milk cows, twenty-five ewes and five brood sows in live stock, forty hens and three roosters, Rhode Island Reds, and a gobbler, and six turkey hens, the milked down eighty acre farm was stocked.

With lime coated on fifteen acres and same manured with old stable manure wheeled out into a close shed, more to get it out of the way, than to preserve it.

This fifteen acre field was sown to alfalfa and the rains came just right to bring it on in good shape. There were twenty acres more of the farm manured, limed and used, some of it to grow sweet corn for cow feed, but a large part of it was sown to red clover; a couple of acres were sown to cow peas.

This method was kept up and all the manure that the live stock would produce was used to the best advantage. The second and third year limited mercantile fertilizers were used as recommended.

EUROPEAN NATIONS FERTILIZE LANDS

Western Europe set out to develop her agriculture on a different basis from the Orient. Germany, Austria, Belgium, France, Spain, Italy and the British Isles are densely populated as compared with the United States. With the great increase in urban population following the intensive industrial development during the last fifty years, and with the decreased emigration, the fields of western Europe have been called upon for much greater yields than was necessary before the coming of the towns and cities. In order to obtain the maximum production from their fields, these countries have made use of scientific research and its applications to the greatest degree. Their farmers place great confidence in the recommendations of their agricultural experts, and as a consequence they make greater use of science in their farm operations. The principle on which they have developed their agriculture is "greater yield per acre and better crops and livestock." The United States up to a few years ago was developing almost too exclusively on the basis of greater production per man power, regardless of yields per acre. In this respect, Europe would maintain a larger population and feed and clothe them better.

From Chas. H. MacDowell's address before American Chemical Society.

GETTING A STAND OF CLOVER

Benjamin Franklin once emphasized the importance of diligence in all things for the man who would be successful. The farmer who consistently gets good stands of clover is usually found to be the man who succeeds in making not only one but all conditions right for the growth of the crop. That he is rewarded for his diligence is recognized by all who appreciate the fundamental place of legumes in successful farming.

A Sweet Soil.—Both experimental work and the experience of farmers have shown that the use of liming materials is essential to the satisfactory growth of both the clovers and alfalfa on most eastern Ohio soils. While soil acidity has developed later in central and western Ohio the benefits from the use of lime are now noticed over large areas. Our small-seeded legumes differ in their relation to soil acidity. Alfalfa and sweet clover require a neutral soil. Red and mammoth clover will grow satisfactorily, other conditions being good, where the soil is slightly acid. Alsike clover is more resistant to acidity than red clover. Where fertility conditions and the supply of organic matter are good, acidity is less injurious than it is on poorer soils. The story of lime has been told over and over again, yet the lime hunger of many fields is unsatisfied and many farmers are still to find their first purchase of lime a very profitable investment. The use of lime is only one factor, although a very essential one, in getting good stands of clover.

Plenty of Phosphoric Acid.—All Ohio soils are hungry for phosphorus. This, as well as the limestone deficiency, must be corrected before we can expect satisfactory returns for the labor expended in tilling the soil. The results of the experimental work with fertilizers in Ohio justify a recommendation of 200 pounds of fertilizer per acre per year for the rotation in general farming. This may be acid phosphate or a mixed fertilizer with a high proportion of phosphoric acid, as outilned in the recommendations for the use of the "Ohio Standard Dozen Fertilizers."

It is essential that the crop with which clover is seeded be liberally fertilized if good hay crops are to be obtained. In an experiment at the Ohio station the same amount of a complete fertilizer was applied to each of a series of plots in a four-year rotation but the applications were made to different crops. The eight-year average increases in the clover crop have been as follows: Fertilizer applied to corn alone, 212 pounds; divided equally between the corn and wheat, 474 pounds; all applied to wheat, 926 pounds; applied to the young seeding after wheat harvest, 1,330 pounds. Good crops of clover cannot be expected unless the grain crop with which it is seeded is generously fertilized.

An Abundance of Vegetable Matter.—Most farmers have often noticed how a good clover stand will be secured on the black land, while the crop may fail completely on the light-colored soil in the same fiield. A liberal supply of organic matter in the soil is necessary to the satisfactory growth of all the small-seeded legumes except sweet clover. Satisfactory crops of alfalfa and red clover cannot be expected on soils deficient in organic matter. Careful use of the manure and the plowing under of good sods and the residues of good crops is probably the most satisfactory and economical way of maintaining the supply of organic matter in the soil. This means a short rotation and the plowing under of a good sod every three or four years. The fertility of the soil cannot be economically maintained when the land is left in grass until the yields of hay decrease noticeably before the field is plowed up.

Good Seed, Well Inoculated.—he alfalfa and clovers grown ould be adapted to the climatic nditions of Ohio if the best re-lts are to be secured. Clover ed imported from Europe has een found to produce crops that not stand the winters as well r produce as good yields as lo-lly grown clover seed. Kan-s-grown alfalfa seed is inferior Dakota or Montana-grown ed for northern Ohio condi-ons. Fortunately, there is now ailable on the market clover d alfalfa seed, the origin, purity d vitality of which are guar-teed. It is no longer necessary r a farmer to buy his clover ed "grab-bag fashion."

Unless inoculated, legumes are nable to use atmospheric nitro-en and often the crop is a fail-re. Inoculation does not require e outlay of much money, time energy, and the results are ery generally satisfactory if the ork is done right. Inoculation recommended for sweet clover alfalfa where a crop is sown n a field for the first time. Eith- the commercial legume cul-res or soil from an established eld of either crop may be used inoculate the seed with assur-nce of success if properly done. the former method is used the irections accompanying the cul-res should be followed closely. the soil method the seed should e well moistened with water and ne quart of fine inoculating soil ixed thoroughly with each ushel of seed, after which it hould be spread out thinly in a ell ventilated place, not in di-ect sunlight, to dry before seed-g.

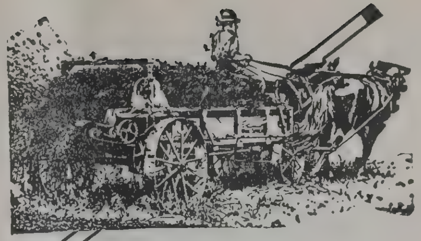
What All Successful Clover rowers Know.—Where soil con-itions are not entirely favorable the growth of clover, there re several practices which will ncourage its growth. Legumes re usually more seriously needed nder just these conditions and very effort should be made to row them. Many farmers have und it advisable to top-dress e wheat on the thinner parts the field with manure for the enefit of the clover. This often eans a good stand of clover on hin land where the crop would therwise be a failure. Too often he supply of manure is limited nd the clover field is patchy. preading straw on the wheat in the fall is another method of encouraging stands of clover where conditions are unfavorable. Probably not over one to one and one-half tons of straw should be used per acre. The fertility condition of soils which require this treatment to grow clover should be improved.

When clover seed is sown in winter grain, the seeding should be done early in the spring when the ground is honeycombed with frost, or later when the ground has dried out, so that the seed can be covered with a disc drill or a harrow. Sowing between these periods is not likely to be as satisfactory, unless there is a good supply of organic matter in the soil so that the seed will likely be covered. The impression seems to be growing among farmers that it is becoming more necessary to cover the seed. Experimental data regarding this problem is lacking, but the evidence seems to favor some method of seeding in which the seed is covered, for all conditions. The stand may not be better under good conditions, but less seed need be used than with broadcast seeding. The money saved on seed will pay good interest on the investment in a grass seed drill.

Safety in Numbers.— Where the soil in a field is not uniformly adapted to any one legume, a very prevalent condition, a mixture of clovers should be seeded. For example, instead of seeding straight red clover, which grows best only on neutral well drained soils, a little alsike will help thicken the stand on the wetter or more acid spots in the field. It is usually well to sow some timothy under these conditions, although on soils naturally adapted to timothy the seeding should be done in the spring and the rate of seeding kept light to prevent the timothy from crowding out the clover. When seeding sweet clover for the first time either red, alsike, or mammoth clover should be added.

When the seed is broadcasted, one bushel of seed for each five acres is usually considered a fair rate of seeding with sweet clover, alfalfa, red and mammoth clovers. For alsike clover, one bushel for each 10 acres is about right.

(Continued on page 20)



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American Farm Bureau Federation News

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

GOVERNMENT HOLDS WHEAT COST HEARING

Higher Tariff May Result from Determination of Production Cost

"A higher tariff on wheat may be made effective by Christmas if the tariff commission will carry out President Coolidge's request for speedy determination of the difference in the cost of production of wheat in Canada and the United States," stated E. B. Reid, of the Washington office of the American Farm Bureau Federation, today while commenting upon the commission's notice that hearings will be held in this country in the near future.

"Canadian wheat is now constantly flowing over the 30 cents per bushel tariff wall and is being sold in the East at a lower cost than Minneapolis wheat," continued Mr. Reid. "There is no room for doubt as to the effectiveness of the present tariff in elevating the price of wheat in the United States above the Canadian price. The question, however, is still further protection and the tariff commission undoubtedly will find a wide difference in the cost of producing wheat here and in Canada.

"In the two fundamentals, land and labor, there is a wide difference. The average price of farm land in Alberta is $28; Saskatchewan, $29; Manitoba, $35, and in Minnesota, $126; Kansas, $80; South Dakota, $106; North Dakota, $50. Thus the virgin lands of Canada give her a great handicap and its wheat is also of superior quality for some purposes and brings a premium on the market. Wages in all lines, including farm labor, are higher here than across the border. In fact, agricultural labor is about the only kind to be deflated in the United States since the war.

"The Canadian wheat grower has a five to thirteen cent advantage over ours in terms of Liverpool prices because of the lower cost of transportation. This means the Canadian farmer gets that much more of the world price.

"If the tariff commission marks time in this matter, our market will break under the strain of Canadian wheat. Besides, the Argentine and Australian crops, which are reported as doing well, will be on the market in January.

"Canada is our chief competitor, both actual and potential. In the five years, 1917-1921, we imported an average of about 24,000,000 bushels per year of which we retained an average of over 17,500,000 bushels for consumption. This hard wheat enters into direct competition with the hard wheat produced in this country. When the duty was twenty-five cents per bushel between 1906 and 1913, there was relatively little difference in the price between Minneapolis and Winnipeg prices, but that was largely because there was only a little wheat flowing over the border. In the last year and a half or so, Minneapolis prices have been considerably higher. Canada exported last year 252,000,000 bushels out of a 390,000,000 bushel crop. This means she can export 323,000,000 bushels from the crop recently harvested, much of which is now held at the Great Lakes ports.

"If the tariff commission fiddles, collecting data from 2,000,000 wheat farmers on cost of production, congress undoubtedly will relieve it of the job by raising the tariff itself. If it acts promptly utilizing the data already in the Department of Agriculture and elsewhere, it may function for the President. The law requires that the commission must first make a preliminary investigation. This it has been doing 'these long weeks' and has just decided to hold hearings. After holding these hearings it must state the facts and make its recommendations to the President. Then thirty days must elapse before the President's proclamation becomes effective. The commission should hold many hearings simultaneously and speed the compilation of its data.

"The American Farm Bureau Federation's representative recently told President Coolidg that if a low tariff on wheat i proving a good thing they ar for more of it."

ACREAGE REDUCTION I URGED IN WHEAT COUNCIL REPORT

Gradual reduction of the pres ent wheat acreage of 62,000,00 to 50,000,000 acres, is the keynot of the report of the productio committee of the Wheat Counci of the United States, which wa in session in Chicago, Novembe 13.

H. W. Moorhouse, director o research for the A. F. B. F., rep resented the farm bureau on th Production Committee of th Wheat Council.

The report of the Wheat Coun cil shows that 50,000,000 acres o wheat would be an acreage suffi cient to take care of domestic de mands, and that on the addi tional 12,000,000 acres can profit ably be introduced alternativ crops.

In regard to co-operative pro duction and marketing, the repor of the committee says, "Co-oper ative marketing processes are i a large measure dependent fo permanent success upon such or ganization of the production be hind them as will permit of se curing the advantage of hand ling a standard commodity. Co operative associations should b an important factor in securin the application of standard methods and practices in productio They represent the most feasibl medium of reaching the individual farmer for the purpose of securing better and more standar practices and methods.

"The committee believes tha the development of farmers' co operative elevators and co-operative selling associations in thi country has resulted in demonstrable advantage to the farmers It seems clear, however, that the full advantage which has been secured in other commodities i this country and particularly i co-operation abroad, has not ye been secured in wheat productio and marketing.

"If the co-operative movemen

s to succeed in securing for the armer that measure of economic eward to which he is entitled, here must be a clear conception n the part of organizers, mangers and members of co-operaive associations of the elements ssential to the permanent sucess and the application of these ssentials as fast as the sentiment ecessary for their adoption can e deveolped in farming comnunities.

"The further development of o-operation on the part of wheat armers should be worked out as part of the long-time program or the improvement of the production and marketing of his prolucts, and should not be expected o bring about an immediate adustment of the discrepancy vhich exists between the prices vhich farmers receive for what hey sell and the prices which armers pay for what they buy."

POOL ALFALFA ORDERS

Hugh Harper, secretary of the rant county, Wisconsin, Farm ureau, is in South Dakota this veek buying 100 carloads of feedng alfalfa to supply pooled orlers of Wisconsin farm bureau nembers.

ALES TURNOVER IN IOWA

Iowa is the greatest livestock tate and the leading cash corn nd oats state of the Union. In otal cash receipts it is second nly to Texas. The sale of farm roducts in Iowa for the crop ear 1922-23 amounted to $603,00,000, or an average of $2,822 or each of the 213,439 farms. arm land in Iowa is capitalized t a very high figure and the raio of sales to property values is herefore low. According to the ensus figures for 1920, the value f land and building in the state vas approximately $7,600,000. ales of farm products amounted o $883,000,000, giving a ratio of ales to fixed investment of 11.6 er cent. The average ratio for arms in the United States was 1.1 per cent. Other midwestern tates underwent very extreme leflation, sales of all crops delining from $286,000,000 to $99,00,000, a result of the concentraion on cereal crops to the pracical exclusion of fruits and vegtables prices of which were less dversely affected than those of he cereals. Corn and oats, it will be remembered, underwent a particularly precipitate decline during this two-year period and the situation was somewhat intensified by a short crop of oats in 1921.

Although the depression was quite severe in Iowa, recovery has been very rapid. Last year farm sales increased 35 per cent over the preceding year, attaining practically the 1920 level. This was the result of higher prices.

J. R. Howard, who served for two terms as president of the American Farm Bureau Federation, efficiently in an address to over 4,000 persons in attendance in Tri-County picnic of farmers and business men at Kewanee, Ill., stated:

"I'm not worred about the agricultural situation with the outlook that it has today. If I had money to invest I would not buy stocks nor bonds, I'd go straight to the land and put my savings in agriculture.

"Is it fair that the farmers, representing a third of the people of this country, should receive less than one-seventh of the total national income?" asked Mr. Howard?

"Until this condition is remedied there will not cease to be an acute national agricultural problem. But we do not have reasons for being pessimistic over this one condition, for it is fundamental. This country will never be in danger of an agricultural peasantry because of the mobility of population and capital."

Basing his deduction concerning the buying power of the farmer on the last census report, Mr. Howard figures that the net output of the manufacturers of American amounts to $27,000,000,000. Three billion more is added for agricultural products not processed, making a total of $30,000,000,000. Before the manufactured products, food and coal reach the consumer there must be added the cost of transportation and distribution.

"While no specific figures are available, information coming from reliable sources, would justify doubling the amount for transportation and distribution, making a total of about sixty billions.

"Counting out in the agricultural department's report of the farmer's income, he will only have $12,000,000,000 left. Out of that comes his operating expense of $5,000,000,000, leaving only $7,000,000,000. That, in reality, is what the farmer has to buy his share of the nation's $60,000,000,000 worth of products."

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327 SOUTH LA SALLE ST., CHICAGO

(Continued from page 17)

When the seed is drilled or harrowed in, the amount can safely be reduced one-third. For hay on fertile limestone soils a mixture of four pounds of alfalfa, eight pounds of sweet clover, and two pounds each of alsike clover and timothy per acre is suggested. Usually a crop of hay, largely sweet clover, can be cut the fall after seeding, and either two or three crops of hay the next season. On poorer soils or those less well supplied with lime, eight pounds of red clover should be substituted for the alfalfa and sweet clover, and the amount of alsike clover and timothy increased. For pasture in rotation on such soils, sweet clover or mammoth clover should be included in the mixture, the former only when the soil is well supplied with lime.

When a spring seeding of clover fails to catch it is often possible to secure a stand by disking the land and reseeding immediately after the small grain is harvested. In good seasons excellent stands of the clovers and alfalfa are often obtained by seeding in corn at the last cultiavtion.

The Bundle of Sticks.—What may we expect in the way of a clover crop when limestone, acid phosphate and the other practices of good soil treatment are put into operation with a good crop rotation on a soil of average fertility? The Ohio. Experiment Station started cropping a 40-acre field used for variety testing in 1894. For the first ten years the field was given one application of manure during the rotation. Then the treatment was changed to include acid phosphate and limestone, and the rotation was shortened to four years by dropping the timothy. Averaging the yields for a period of years they have increased as follows: Corn, from 48 to 74 bushels; oats from 48 to 61 bushels; wheat from 21 to 33 bushels, and clover hay from 1.5 tons to 3.5 tons. Good soil treatment has been responsible for a 133 per cent increase in the clover crop. How many farmers in Ohio are raising three and one-half tons of clover hay to the acre?

Farmers in dairy and livestock regions often say that the hay crop is the most important crop in the rotation. Farmers who have good crops of clover almost invariably have satisfactory yields of other crops. The hay yields and the fertilizer practices of ten farmers in northeastern Ohio who have community soil demonstration fields have been compared. These ten men averaged 207 pounds of fertilizer per acre per year. Manure and limestone were also used on all these fields. The average yield of 18 hay crops on these demonstration fields was 2.6 tons per acre. In five cases, only the first crop was cut for hay, the second crop being pastured or plowed under. One yield of 5.5 tons of clover for two cuttings was reported.—Earl Jones, Department of Soils, Ohio State University.

SPREADING MANURE

In applying manure to the soil it is important to get an even distribution over the field. This can be done most satisfactorily by means of a manure spreader. A spreader is not absolutely essential, however, and if care is taken a fairly good job can be done by hand. That is, if a man cannot afford a spreader he should be all the more diligent about applying manure. The all-important thing is to get the manure back on to the land with the least possible loss. However, most farmers will succeed in getting more manure on the land when they have a spreader, since it can be kept where it can be loaded as the manure is produced and unloaded whenever a team is available for a few minutes time. The labor and time saved will soon pay for the spreader. The advantage in using a spreader is not due so much to the saving of labor as to the fact that the manure is spread evenly and in a thin layer so that it will go farther. Where manure is scarce it is advisable to make it cover as much land as possible. The spreader also serves to tear the coarse manure to pieces so that it may be readily worked into the soil.

There are also machines on the market for loading manure into the wagon or spreader. These may be used to good advantage where a farmer has a large supply of manure to be hauled out at one time, especially if it is in an open lot or large shed where a team can be used in loading. While loaders are quite satisfactory for certain conditions of this kind, their usefulness is somewhat limited, and they are hardly adapted to the small farm.

For dairymen or horsemen who have large amounts of manure to remove each day, an overhead litter carrier will be found very useful. The spreader may be left under the carrier until filled. This greatly reduces the amount of handling, while the carrier makes the cleaning of the barns a much lighter task. Bulletin 166.—Mo. Col. Agr. Expt. Station.

POPULATION OF THE UNITED STATES IS INCREASING AT A RAPID RATE

Per Capita Production of Food Now on Decline

Statisticians have estimated that our population at the close of this century will be more than 220 million and have placed the probable time in which we shall begin to import the staple foods at from 15 to 30 or more years. Even if it should turn out to be the longer period it is time we were considering the problem not only from the national point of view but also from its effect on agriculture.

In the 50 years following the Civil War we increased our cotton production five times, our wheat production four times, our corn production three times, while our population increased only two and three-fourths times.

The peak of agriculture production per capita of population was passed in 1898, nearly a quarter of a century ago. Agricultural production almost kept pace with population increase for some little time after that date, but in the last decade it has steadily and ever more rapidly fallen.

The United States is today a food-importing nation, measured in dollars; that is, we import more sugar, tea, coffee, spices, nuts and tropical fruits than we export in wheat and meat.—Soil Imp. Com. N. F. Ass'n.

KEPT BUSY

"I suppose your wife is enjoying herself at your summer cottage."

"Not very much. She has three women visiting her, each on a different kind of diet."—Boston Transcript.

(Continued from page 4)

16. The result from these fields o show that while either liming the use of a phosphate fertili- r by itself will pay, by far the st thing for the farmer to do is both lime and use phosphate fer- izer. It seems now that for gen- al farming, not only the best but e only commercial materials eded on Kentucky soils are ound limestone and a phosphate rtilizer, preferably acid phos- ate. However, with respect to osphate fertilizer, the important ing is not which one to use, but st to use one, knowing that any e will give good results.

17. On the Kentucky experi- ent fields outside the Bluegrass gion the average yearly increases date per acre from liming and e use of acid phosphate are: 13.9 shels of corn, 1,273 pounds of ybean hay, 7.6 bushels of wheat, d 2,143 pounds of clover hay. e dollar invested in these ma- rials has given crop increases orth around $3.50.

Questions for study—What is e only way to add to the supply phosphorus in soils. 2. Name e phosphorus fertilizers. 4. Tell ere each comes from and how is prepared for market. 6, 11 d 14. Why is only a small ount of steamed bone meal ed? 9. What advanatage has ck phosphate over acid phos- ate? 15. What disadvantage? . Which would you use?

FARMERS MARKETING WITH CONSUMERS

Seventy years ago the farmers ithin 30 miles of Philadelphia, arketed the farm products once week for Saturday market; a w would also attend the 'ednesday market in the city.

The two principal market places ere on Market Street and Spring arden Street. These are wide reets and the house is in the nter of the street leaving a iveway on each side of the arket house. The house was out 20 feet wide and roofed er and on the sides the stalls ere placed, each facing the cen- r. The stalls were about 12 to feet long, and shelves to dis- ay the goods—a movable low unter on which receptacles for e butter, eggs, meats and other oducts were placed.

The butter and products were rried in market wagons with springs, from the farm to city in nice, clean butter tubs with the farmer's name on, capable of containing 100 pounds. It had been weighed and made into pound prints and wrapped each with a white buttercloth, which was unwrapped as placed in the customer's receptacle. There was neatness and a cleanliness always prominent. Butter was not touched by the hands in the market. The products consisted of butter, cottage cheese, dressed poultry, the week's fresh eggs, veal, lamb, mutton, fresh pork, and sausage. Fruits, berries and vegetables were sold in season. These were true diversified farmers. About two-thirds of the farmers followed this plan of marketing. The regular customers paid good prices.

BE ECONOMICAL

Silage is wonderful food when the pastures dry up for cattle and especially for the dairy, as it will keep up the flow and richness of the milk equal to full pasturage. The silo is virtually a farmer's savings bank.

The cow that can only produce five pounds of butter a week at her best, should be replaced with one that can double it. Do not save the heifer calves of the five pounder as like produces like.

The sow that only produces five pigs in a litter should be fitted for the pork market and her place filled with a sow whose litter of ten will weigh over a ton at six months of age.

It has been proven by thorough tests of the U. S. Department of Agriculture, that pure bred hogs make 38 per cent greater profit than common hogs. This is an opportunity to save that should not be neglected.

Diversified farming is by far the safest method of farming. Besides the most profitable it is more helpful in keeping up the fertility of the soil. The farmer who makes wheat growing his exclusive market crop besides being liable to failure some years, is deleterious to the soil by selling off the product of the soil it is exhausted more rapidly unless fertilized.

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CHEMIST'S WORK, THE SOLUTION

By Chas. H. MacDowell
Chicago, Ill.

The chemist's big agricultural problem is fertility. As a matter of fact very little is known as to the relative importance of the various elements of fertility. Is plant food more important than moisture? Will bacteria destroy soil toxins? We are still groping in the dark on soil fertility. We have data giving specific results of certain fertilizing experiments under one set of climatic conditions on a given crop and soil. But who has made any progress in determining why these results were obtained, or how they can be interpreted in connection with a different set of conditions?

True, our worries on plant food supplies seem to be largely over. For a time it seemed as if the supply of available nitrogen was rather definitely limited. In the past few years the progress made in the fixation of atmospheric nitrogen has opened up unlimited supplies of this element.

If we forget political and geographic boundaries, there is sufficient available potash now blocked out to supply the world for a long time to come. Undoubtedly new deposits will be discovered. The present industrial by-product waste of available potash will be further studied and this product saved for agriculture. The vast supply of potash in our shales and feldspars and other igneous rocks will remain as a reserve supply in case other sources fail. The potash from these sources is available now at a cost. Probably our chemists will find new processes which will enable these insoluble sources of potash to equal or better foreign prices.

The reserve supply of phosphate seems to be adequate so far as any reasonable time element is concerned. However, before long it will be necessary to call on the immense deposits of Idaho and other Western states. The problem of transportation will again be before us. We have methods now for rendering the insoluble phosphates of lime available for plant food. They are reasonably efficient in so far as there is little waste of phosphoric acid, but they necessitate the use of an equal quantity of sulphuric acid and a 50 per cent dilution of the product. Here again transportation intervenes. The present freight cost precludes the use of any but the higher grade phosphate rocks. The chemist has before him the problem of rendering the phosphoric acid of these insoluble compounds available for plant food without necessitating the reduction of the plant food content so that excess transportation charges may be overcome. He will, in the near future, be called upon to develop processes for utilizing the lower grade phosphates and phosphatic limestones of Tennessee and Kentucky and even to work over the waste dumps of present-day running.

For a long time it has been considered that these three elements, nitrogen, phosphorus and potassium, were the only plant foods necessary to supply ordinary soil. Recent years have brought about some change in this belief. Certain crops seem to demand some other element that is ordinarily not abundant in all soils. For instance, only within the last few years it seems to have been proved definitely that the tobacco plant must have a certain amount of magnesia in its food supply in order that it may properly cure. It is claimed that the superexcellence of the Hawaiian pineapple is due to the manganese present in these soils. Are we then to believe that only these two plants are peculiarly susceptible to such conditions? Can we not safely assume that every plant has a similar necessity? Most of the experiment stations of the country are now studying the effect of sulphur, both elemental and in compounds, on various crops. Oregon has shown surprising results on legumes with sulphates. New Jersey applies elemental sulphur for reaction within the soil itself. What a research field is opened to the agriculturalist and to the chemist!

CROP COSTS IN 1922

The United States Department of Agriculture finds that the average cost of production by farmers in 1922 was 66 cents per bushel for corn, $1.23 per bushel for wheat and 53 cents for oats.

The average cost per acre for corn was $23.01, figured on average yield of 35 bushels at 66 cents per bushel. Of the cost 52 per cent was for man and horse labor, 16 per cent for fertilizer and manure, 2 per cent for seed, 23 p cent for land rent and 7 per ce for miscellaneous items. Ave age selling price of corn in 19 was 73 cents.

The average cost of producin an acre of wheat, $19.68, on yield of 16 bushels per acre cos ing $1.23 per bushel. Costs we 46 per cent for preparing see bed, planting, harvesting, thres ing and marketing; land rent, 2 per cent; fertilizer and manur 12 per cent; seed, 9 per cent; mi cellaneous, 8 per cent. The av erage selling price of wheat i 1922 was $1.11.

The average cost per acre oats was $17.40, making the cro on the basis of 33 bushels pe acre cost 53 cents per bushel. Th average selling price was 48 cent Of oats cost 50 per cent was ma and horse labor; 8 per cent fo fertilizer and manure, 7 per cen for seed; 27 per cent for lan rent; 8 per cent miscellaneou cost.—Mo. Clip-Sheet.

"KICKS KULTUR"

Editor: Would you allow a old farmer to ask you and th readers of the Improver wh "Kultur" had to depend on th United States of America to in vent and put into practice tel egraphy and hundreds of uses fo electricity, while the use of stea power was discovered and pu into practice by a citizen of th United States?

"Kultur" also failed to advanc the interest of the farmers by in venting and manufacturing th mowing machines, reapers an binders; the riding plows, bot horse and steam, of two and fiv furrows; the steam threshers an cleaners, and thousands of othe useful saving implements an machinery labor-savers, to ad vance and benefit mankind, an the farmers especially. Then again, the first autos, the first ai traveling or flying machines, an even the submarine were al American inventions.

Then what has "Kultur" done
Falsely claimed to be wise;
By inventing mean lies,
Always truth crucifies.

—A Yank.

We are all dependent upon the soil of the farm, it is the supporting foundation for every industry and business as well as the happiness and lives of the people.

[ND FALL PLOWING PAYS

Minnesota Experiment Station
ıs observed that in the past year
ere was more plowing done in
ugust and September than at
ıy time before.

It has been proved that the best
ops are nearly always secured
ı the early Fall plowed land.
ne cause for this undoubtedly
that the Fall plowed ground
:s open and porous, ready to
ceive the Fall rains, and ab-
rbs a larger amount of mois-
re than unplowed land.

Early plowing also gives time
r the land to settle again before
oring and allows it to become
mpact enough to re-establish
ood capillary action, thus getting
oisture to the plants when mois-
re is needed.

The decay of vegetable matter
the soil, the storage of rain,
ıd the conservation of soil mois-
re are all important factors in
aking the next year's crop. In-
ct pests are also held in check
Fall plowing, and time is
ved in getting the crop into
e ground in the Spring. Early
eding often gives assurance of
good harvest.

LANT REFUSE DIVIDED BETWEEN FIRE AND SOIL

Every Fall after the vegetable
atch and the home grounds have
een given their clean-up and all
efuse and plant remnants have
een gathered in a heap, the
nateur gardener faces the ques-
on—"To burn or not to burn".

Soil experts tell him, "The more
egetable matter you work into
our soil, the better crops it will
row", and advise him to dig in all
ıe leaves, stalks, weeds and other
egetation that he can get hold of
ı order to keep up the supply of
umus in the soil.

The plant disease expert, on the
ther hand, emphasizes the value
f the bonfire as a means of de-
troying fungus enemies of our
arden plants which, if not thus
ealt with, will pass the winter
omfortably on the old dead plant
emains and be all ready for busi-
ess when next year's garden veg-
tables are started in the spring.

Which advice is he to take?
hall he sacrifice humus and pro-
ect next year's crops from disease
r shall he gain some vegetable
naterial in the soil at the risk of
oss from diseases next season?

The Bureau of Plant Industry of the Pennsylvania Department of Agriculture points out a middle ground in this matter which satisfies both sides without taking undue chances either way. The State plant specialists advice the burning of refuse from such garden plants as are likely to carry disease into the coming year, the refuse from all other plants to be dug under as the soil expert advises.

Among the plants which should go on the bonfire are: potato and tomato stalks, cucumber vines, beet leaves, beans, asparagus tops, celery refuse and, from the flower garden, the above-ground parts of hollyhock, all fallen rose leaves, the entire aster plant including the roots, and the old tops of phlox.

Plants which may be dug into the garden soil with comparative safety include: weeds, the refuse of salsify, spinach, parsnip, onion, horseradish, corn, lettuce, turnip, cauliflower, cabbage and carrot. If additional vegetable material is desired and a good supply of barnyard manure is not available, the leaves of shade or other trees make a good substitute. While these leaves often carry diseases none are likely to affect garden plants and they may be used safely as a source of humus.

Penny, Dept. Agr.

WHO GETS THE MONEY?

	Per cent
Farmer	67.7
Hauling	4.3
Creamery	6.7
Railway	2.3
Storage	0.5
Shrinkage	0.7
Receiver, jobber, broker	5.0
Packaging	2.9
Retailer	9.9
Price to consumer	100.0

Forty million pounds of butter has been pledged to the new sales department of the Minnesota Cooperative Creameries Association, according to A. J. McGuire, general manager.

CONDUCT POULTRY SURVEY

A state-wide survey to determine the exact poultry situation is being conducted by the New York State Federation prior to any attempt to organize a co-operative poultry association in the state.

DIVERSIFIED FARMING RATIFIED BY MISSOURI

The state of Missouri ranks third in total value of its agricultural products. No other state in the Union produces in quantity a larger number of staple crops. Corn, wheat, oats, clover, alfalfa, timothy blue grass, cotton, rice, tobacco, flax, melons, fruit, all are extensively grown.

APPOINT FRUIT COMMITTEE

The Illinois Agricultural Association has appointed an advisory committee of six for the fruit and vegetable marketing department of the state organization. It is hoped that a great deal of interest may be stimulated in co-operative marketing in both fruits and vegetables during the coming year.

Turn to page 2 for your Christmas Gifts and how to supply them.

EDGEWOOD
13 Acre Turkey and Poultry Ranch
FOR SALE: Nice young thrifty Narragansett toms from prize winning stock, $10 and up. Also three and four year old hens at $7 each.
My strain of purebred turkeys have been bred for 19 years for size, vigor and egg production.
Have shipped into 22 states with statisfaction that brings re-orders. Satisfaction guaranteed.
Mrs. S. H. Brooks, Salem, Indiana

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Baynes' Soil Improver offers you an opportunity to keep posted on best modern methods at a low cost.

"Make Two Blades Grow Where One Now Grows"

JUST ASK THE MAN WHO KNOWS

Fred E. Barnes of the Colorado Agricultural College and Experiment Station says: "We have read the October issue of your magazine through with much interest. I find it is clean, snappy and inspirational and as far as I know is a pioneer in a field that has been discovered and filed on by no other publication.

"I congratulate the editor for his discernment."

AGRICULTURAL COLLEGES

RECOGNIZE ITS WORTH

←

COUNTY

AGENTS

LIKE IT

R. L. Blackwell, county agent of Gordon county, Georgia, writes: "I have just received a copy of your 'Soil Improver,' October issue, which I like very much and also wish the back numbers July, August and September. 'Baynes' Soil Improver' made a hit with the farmers in the County."

FARM

ADVISERS

TAKE IT

SUCCESSFUL FARMERS

APPRECIATE THE NEED

→

R. H. McCown, Kirksville, Ky., in subscribing for "Baynes' Soil Improver" says: "I congratulate you upon publishing a magazine for which there is such an urgent need today, covering a field so technical in a most comprehensive manner. With my best wishes for your success."

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The only monthly devoted exclusively to the care and feeding of your soil will be sent to any address in the U. S. for one year, for 25 cents in coin or stamps. If you send one dollar for five years' subscription we will give you a valuable 74-page booklet, "Feeding Dairy Cows," as a premium. If you are already a subscriber do your neighbors and friends a favor by telling them of this big opportunity. Enlist today in the great army of Soil Improvers—complete course for 25 cents. Write now.

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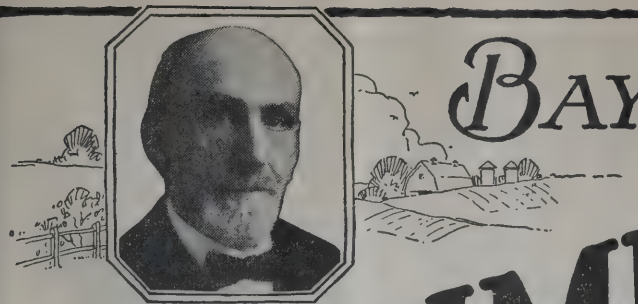

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A MAGAZINE

Devoted to larger crop yields

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

Vol. 1 JANUARY 1, 1924 No. 7

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HELLO 1924

ALL HAIL TO THE GLAD NEW YEAR,
MAY IT BRING TO ALL GOOD CHEER,
PASS IT ALONG WITHOUT FEAR,
AS WE'LL HAVE A GOOD STOCK HERE.

The old year having shed its leaves of disappointments is numbered with the past.

The outlook for the New Year is rich with cheerful buds of promise for a bountiful fruitage, assuring the Farmers its favors for 1924.

The Agricultural industry is entering a New Era, one highly progressive, in Scientific farming. The farmer has the benefit of the research of the most able professors in the Agricultural Colleges and Experiment Stations. Which is a most valuable and cherished boon to the farmers of America.

The Soil is the life and producing power of the farm it must be given the food science has shown it requires to meet its mission of producing maximum crops and retaining its productive power. The SOIL gives through the field and flock the farmer's profit.

Scientific Farming is the superior process of practical farming. It will be initiated by the general farmer because of its great advantages. The principles and practice of scientific farming will soon be understood and as familiar to the general farmer as the old style. Every farmer who wishes to attain success will be compelled to adopt it. The same as in the past, the mower and the reaper superseded the scythe and cradle.

SCIENTIFIC FARMING will be the great agricultural victory for 1924.

We trust it will be accompanied by prosperity for the American Farmer and may he receive the blessing for his work in producing the food for the millions who daily pray to God for same.

HAVE FAITH IN THE SOIL AND GOD'S PROMISES

Published monthly by JAS. BAYNES & CO., *327 So. La Salle St. Chicago, Ill.*

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TABLE OF CONTENTS

Page
Phosphorus.
Hogs in Demand in 1924.... 2

Elementary Study Course.
The Soil Contains Food Elements.
Commercial Fertilizer 3

A Hint to Specialist Farmers 4

EDITORIALS.
Reduce Wheat Acreage at Both Ends.
Habits Hard to Break.
Dead Soil 5

Hoover's Surplus Crop.
Farmer's Safety Tower Lights 6

Protect the Farmer's Interests.
Consideration of 1923 Wheat Crop.
Why Teach Agriculture?... 7

Broom Corn in Missouri.... 8

Page
Effect of Sod on Tree Growth.
Winter Use of Lime.
Compliments Alfalfa 9

County Advisers' Department.
Scientific Farming by Feeding Soil.
Approval of Offer.
Agents Work.
Most Important Study...... 10

Sweet Clover.
Four Kinds of Blue Grass... 11

Plants in Soil Building.
Legumes Help Farmers.
Litter Improvement 12

Illinois System of Permanent Soil Improvement 13

Optimistic on the Future... 14

Fail to Breed and Abortion.
Increase in Silos........... 15

Questions and Answers on Soy Beans................ 16

Page
American Farm Bureau Federation News.
Fifth Annual Meeting.
Credentials Committee Seated 52 Directors 18

Too Good to Pass Up.
Farmers' Week.
Center Attraction.
Green Manuring Cheap Fertilizing Method 19

Experiment Station Advice.
Missouri Soil Survey.
Fertilizer Tankage Not Fit Animal Food.
Corn Breeding 21

Save Valuable By-Products.
Many Farmers Are Terracing 22

Hay Leading Pennsylvania Crop.
Secretary Hoover Speaks.
Quarantine Against Alfalfa Weevil 23

PHOSPHORUS

Phosphorus is the master key to permanent agriculture. The greatest economic loss that America has sustained has been the loss of energy and profit in farming with an inadequate supply of phosphorus. This was the pronouncement of Dr. C. G. Hopkins, one of the most eminent and practical professors on the Soil Treatment and at one time chief in Agronomy and Chemistry of Agricultural Experiment Station, University of Illinois.

HOGS WILL BE IN DEMAND IN 1924

Owing to the large shipment of hogs from the farms to the pork market from the 1923 crop, reducing all surplus.

The demand for the fresh meat from young porkers is constantly growing. Its sweetness and tenderness compares with the chicken fries. The high price of the 1922 crop of corn which was fed in 1923 caused unusual close shipment from the herds of hogs. The year's shipments were greatest in several years. It was surprising as soon as the jam of the disorderly shipments let up, that the price would lift itself again, as the stock of cured meats is not burdensome.

The conditions are right for a future demand for hogs, as the 1924 season advances, while the large crop of corn is more valuable for feeding than marketing. This demand, judging by past experience, will make from 8 to 9 cent pork hogs along the season.

PURE BRED HOGS PROFIT ONE-THIRD GREATER THAN COMMON HOGS

The Secretary of Agriculture, by a most thorough test by scientific feeders, through many months, to ascertain the difference between pure bred hogs and the common hogs, when grown and fed for the pork market. The hogs were treated with fairness in the feeding and marketing, making the test a practical one.

This proved in the many tests made; the average profit of the pure breds were 38 per cent greater than the common hogs. Every up-to-date farmer should supply himself with pure breds. One of the cheapest methods is to buy a pure bred sow or two to farrow a nice litter this spring. Now is the time to buy them; they are selling reasonable.

OKLA. O. K.'S "IMPROVER"

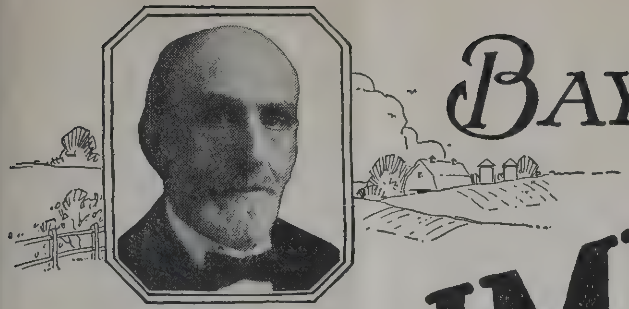
Leon J. McDonald, vocational agricultural teacher at McLoud (Okla.) College, attended a meeting of the Oklahoma Cotton Growers' Association and handed a copy of Baynes' Soil Improver to the president of the association, who complimented the magazine very highly, and nine of the attendants subscribed for it. Mr. McDonald is one of our enthusiastic friends who believe every farmer is helped by reading the magazine.

VERY RARE

"I told the publisher's pretty daughter that I'd like to marry a girl like her."

"What did she say?"

"She said the edition was limited to one copy."—Boston Transcript.



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

Vol. 1 January 1, 1924 No. 7

THE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

The Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

Lesson 8

Commercial Fertilizers

1. In lesson 2 we learned that the plant foods commonly thought most likely to be low in soils are nitrogen, phosphorus and potassium. In later lessons we learned that, of these three, phosphorus is the only one the average farmer needs to buy; that he can best get nitrogen from the air by the growth of legumes, and potassium from the large supply in the soil by keeping plenty of organic matter in the soil.

2. However, all three of these plant foods can be and very often are brought in fertilizer form, though most often this should not be done. Fertilizers can be bought that supply only any one of them, or that supply combinations of nitrogen and phosphorus, of phosphorus and potassium, or that supply all three.

3. The common fertilizers that supply only nitrogen are sodium nitrate, ammonium sulfate, dried blood, tankage and cottonseed meal. Sodium nitrate is mined from extensive deposits in Chile, and as placed on the market contains 15 to 16 per cent nitrogen. Ammonium sulfate is a by-product, principally of the manufacture of coal gas and of coke. It contains about 20 per cent nitrogen.

4. Dried blood and tankage are by-products of the big packing house plants. Dried blood contains from 6 to 13 per cent nitrogen, depending upon the purity. Tankage contains from 4 to 9 per cent nitrogen and also from 1 to 5 per cent of phosphorus. Cottonseed meal is made from the cake of the pressed cottonseeds. It contains about 7 per cent nitrogen and 1 per cent phosphorus.

5. Nitrogen in all these fertilizers costs about 20 cents per pound. Sodium nitrate is the one most commonly used and for most purposes, the best one. Commercial fertilizer nitrogen for the most part can be used with profit only on truck crops or crops on high value per acre, such as strawberries, cucumbers and cantaloupes; on tobacco, and sometimes in the spring on wheat when the wheat is not starting growth as it should, and when it is known that the crop has plenty of phosphorus.

6. We studied the fertilizers supplying only phosphorus in the last lesson. What are they?

7. The two most common fertilizers supplying only potassium are potassium chloride, commonly called muriate of potash, and potassium sulfate. Each of these fertilizers contains about 42 per cent potassium. There are some sources of potassium fertilizers in the United States but nearly all the potassium fertilizers used anywhere in the worrld come from the very large potassium deposits in Germany and France. Potassium in fertilizer form costs about 8 cents per pound.

8. Potassium fertilizers, like nitrogen fertilizers, very often pay on truck crops and particularly on root or tuber crops, but not usually on the field crops unless the soils are sandy or in a very run-down condition and very low in organic matter, when they sometimes pay, until the soils are partially built up.

9. Fertilizers containing all three, nitrogen, phosphorus and potassium, are known as complete commercial fertilizers. A considerable amount of such fertilizers is used in Kentucky, though for the most part not wisely.

10. The usual complete commercial fertilizer contains about 1 and two-thirds per cent of nitrogen, 3 and one-half per cent of phosphorus and 1 and two-thirds per cent of potassium. They are made by mixing together the correct amounts of materials conaining the single plant foods. They cost all the way from $25 to $50 per ton. This is considerably more than the actual plant food in them is worth at market price, or in other words, the buyer pays a high price for mixing. (In buying any fertilizer, it must be remembered that the important thing is not the price per ton, but the price per pound of the plant food wanted. Very often the fertilizers which cost the least per ton are the most expensive, because they contain but small amounts of plant food and cost more per actual pound of plant food supplies.)

11. Complete fertilizers for the market are usually sacked in 125 or 200-pound sacks. It is usual to sell all fertilizers in sacks except ground rock phosphate and ground limestone, which are often sold in bulk. The composition or nature of the fertilizer is indicated on the sack. Generally there are so many statements on the sack, most of which are useless, that it is pretty

hard for one to tell how good a fertilizer it is. If you will hunt out just three statements—one showing the total per cent nitrogen present; one, the per cent available phosphoric acid, and one, the total per cent potash, you will have all that is needed to determine the value of the fertilizer.

12. All fertilizers sold in this state must be inspected by state officials to determine whether the fertilizer is what it is guaranteed to be or not. The state law requires that every sack or other package of fertilizer sold in the state shall have a tag attached, issued by the Experiment Station, with a paster showing that the sale of the fertilizer has been authorized. The statements on this tag are practically the same as the ones above said to be needed to determine the value of the fertilizer.

13. We learned in the last lesson that fertilizer people say phosphoric acid rather than phosphorus (1 part of phosphorus, we learned, equals 2.3 phosphoric acid). In just the same way they say ammonia rather than nitrogen, and potash rather than potassium. One part of nitrogen equals 1.2 parts of ammonia, and likewise 1 part of potassium equals 1.2 parts of potash. There are symbols for all these terms which are very often used, such as N for nitrogen, NH for ammonia, P for phosphorus, P O for phosphoric acid, K for potassium and K O for potash.

14. Complete fertilizers are nearly always sold under a brand name, as if they were best suited to some particular crop. Thus there are corn growers, wheat growers, tobacco growers, etc. We have already learned that all crops use the same plant foods and in about the same relative amounts, so that a fertilizer which is good for one crop is about equally good for all crops. The names of fertilizers usually mean very little or nothing at all. (See Bulletin 191 of the Kentucky Experiment Station.)

15. Farmers who use complete fertilizers usually apply about 150 pounds per acre. This amount of the most common of these fertilizers cost about $3 and contains about 2½ pounds each of nitrogen and potassium and 5¼ pounds of phosphorus. When you recall that a 50-bushel corn crop requires 74 pounds of nitrogen and 48 pounds of potassium for its growth, and that the turning under of one ton of clover hay adds 40 pounds of nitrogen from the air, and that the plowed soil over an acre contains 25,000 to 30,000 pounds of potassium, then you can see that the adding of the small amounts of nitrogen and potassium shown above in the commercial fertilizer can have but very little effect. Usually the main increase from the use of complete commercial fertilizers comes from the phosphorus supplied. The five and one-fourth pounds of phosphorus in the above application is enough to grow about half of the 50-bushel corn crop, but if the $3 used to buy this complete fertilizer had been used to buy acid phosphate, 20 pounds of phosphorus could have been obtained rather than 5¼.

16. The farmer should get his nitrogen by growing legumes, he should get potassium by making it available from the soil, and he should invest his money for fertilizers in ground limestone when needed to help the growth of legumes and in one of the phosphorus fertilizers to supply the plant food phosphorus, without which good crops cannot be grown on most Kentucky soils.

Questions for study.—Name the common nitrogen fertilizers. 3. The common potassium fertlizers. 7. On what crops should these fertilizers be used? 5 and 8. What are complete commercial fertilizers? 9. Why should the farmer generally not use complete fertilizers? 15. What are the only fertilizers the farmer should use for the common field crops? 16.

A HINT TO SPECIALIST FARMERS

The people of the United States have consumed 160 million pounds of butter more than last year, or more than ever before, while the production was increased 100 million pounds over the previous year to meet the enlarged demand. The home demand compelled the importation of sixty million pounds of foreign butter to supply the wants of our butter eaters. The thick spreading of the butter is an indication of the improved condition of the people as a whole.

This should be an emphatic hint to the wheat specialist to invest in a few cows as a safe step towards diversifying. Feeding some of the poor wheat and turning it into butter would help the farm as well as the farmer.

The dairy sections of the country are credited with being highly prosperous.

FILLS A LONG FELT VOID

Allow me to congratulate you upon the splendid new publication you have launched on Soil Fertility. It is the leading and most important question that is up to the farmers of the whole country.

I have no doubt about its success, as it fills a long felt void in farm management.

Your old friend,
W. W. Stevens, Memphis, Tenn.

BEING REMINDED

Secretary Jewell Mayes of the Missouri Board of Agriculture, says: "The outlook for red clover seed is for a scarcity, and prices cannot be low. The tests of imported seed by the United States Department of Agriculture show defects. The indications are there will be large imports of seed for 1924. Bureau advise farmers to procure such strains as known to prove satisfactory in this country. The farmers of the United States should raise sufficient for domestic demands.

One-half the wool used in this country by the wool industry is imported. This is a hint for the diversified farmer to increase his wool producers. A flock of sheep should be on every farmer's staff.

The American Farm Bureau Federation reports that Iowa farmers' conditions have improved rapidly this year.

EVENING UP

He—"Is she progressive or conservative?"

She—"I don't know. She wears a last year's hat, drives this year's car and lives on next year's income."—Modern Grocer.

KEEPING TO THE POINT

Porter—"This train goes to Buffalo and points east."

Old Lady—"Well, I want a train that gets to Syracuse and I don't care which way it points."—Dry Goods Economist.

BAYNES'
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EDITORIALS

REDUCE WHEAT ACREAGE AT BOTH ENDS

For the purpose of reducing a troublesome surplus in the production of the 1924 crop of wheat, the farmers of their own good judgment and upon the advice of the U. S. Secretary of Agriculture, American Farm Bureau Federation and the papers devoted to the farm interests, made a moderate reduction in the acreage sown this fall to winter wheat.

There is another source of supply besides our acreage, which is the wheat crop of Canada. To protect this inlet, we have a tariff on each bushel of thirty cents, to admit into the U. S. to swell the surplus.

Canada has raised an immense record breaking crop of wheat in 1923. They have many large fields in which the yield was sixty bushels to the acre. The labor on plowing, sowing and up to the harvesting is no more on a 60 bushel yield than a 20 bushel crop.

Canada can raise from two to three bushels for the cost of one bushel in the United States. Their labor cost is cheaper than ours, they found it profitable to pay the present tariff of thirty cents and overflowed the protection with the many millions of bushels monthly.

Therefore Canada is at present the only parties who would be benefited by the reduction of our acreage. They would increase theirs and enlarge their profits. Their wheat is sown in the spring, they are enviably situated, to regulate their acreage, governed by our condition at their seed time.

The farmers of the United States' only protection is in a higher tariff, it should be sixty cents a bushel. This would help the farmer and should not cost the consumers of the cities more than the present prices charged for bread by the bakeries, which is same as when wheat sold at $1.75 a bushel.

Here is an opportunity for Congress to save the farmers loss on wheat production and give the needed adjustment relief.

HABITS HARD TO BREAK

Habits formed by persons, stick to them with a stubborn tenacity, even those that are detrimental and injurious to them. It is the bad habits that are hardest to break, while desirable good tendencies are sometimes too easily departed from.

This question on "habits" is so generally admitted rendering it unnecessary to offer proof. But we will mention one instance relative to the farmer. It has been shown by practical test by most competent feeders at Experiment Stations, that pure bred hogs average 38 per cent more profit in feeding them for the pork market, than common hogs. With these facts published in all the breeders and farm papers after two years, there are less than 12 per cent of the many millions of swine in the United States that are pure breds.

Is the difficulty in not taking the right methods to change the habit to a better one? There are different plans used to make changes and some are better than others.

We will give one plan which we believe is the most effective in changing wrong habits in farming to a more progressive one, that impresses and influences the farmer to pull himself out of the rut started by his forefathers. It is the practical proof of having a neighbor, farm on the most scientific advantages established by the agricultural colleges and experiment stations.

By this plan this neighbor produces larger yields that are in plain convincing sight, astonishing the surrounding farmers. They will change, if for no other reason than one of shame for their weakness and losing out principle.

Thus, we will suggest to our esteemed, Dean Mumford, another reason "Why Teach Agriculture?" in his strong article in answer to this question which is published in this issue. Teach agriculture, to the farmer youths of the United States that the right habit seed may be planted in the youngsters, to grow them up into superior scientific farmers.

These scientific agricultural graduates are to be used as efficient models, being installed in varied sections of the different states as plain copy showing the new way as taught by Science with the practical proof of its advantages in the greatly enlarged yields and corresponding profits. They not only hear with their ears, but see with their eyes.

While we could not expect to get all farmers, as there are some of us want our way because its ours. But the great majority of farmers would be won by the better and superior farm methods.

This would advance the Agriculture and Agriculturist of the United States to such a high standard of excellence and dignified superiority that the American Farmer would be the noble husbandmen of the world.

DIVERSIFIED

The farmer whom deflation did not cramp
Is sure to get there, as a postage stamp;
He sticks to the farm, which is really wise,
With crops and live stock, he diversifies.
It's profit and pleasure for him to toil,
And increase the growth and yield of his soil;
His cash each year from the farm grows in bank,
He is a Dirt Farmer of highest rank.

DEAD SOIL

The soil in its original native condition has maintained its strength by feeding and living on its own product.

When the pioneer farmer takes possession he commences plowing, planting, sowing and harvesting. He usually treats it as if its productive strength was everlasting and self-sustaining without feeding.

Each crop that is grown and removed from the soil weakens it that much. This practice continued, of yearly reduction of strength until it is completely exhausted, and the soil is virtually dead, so far as yielding growth and life to plant.

If all the soil should be in this condition, it would present a dismal picture of gloom, desolation, destruction and death from which man would flee in horror. Yet it has one redeeming feature. It can, by proper feeding, be restored to life and become strong and productive again.

The soil is controlled and operates by virtue of the laws of nature, producing the life-giving food to man, animal and plant, and is a wonderful and interesting study to farmers or others.

The farmer's mission is to maintain the soil in a high state of productiveness, growing maximum crops, upon economical feeding, suited to the soil, rendering the greatest profits. Thus complying with nature's laws as the Creator intended.

HOOVER'S SURPLUS CROP

Hon. Herbert Hoover, Secretary of Commerce and Labor, has a surplus crop trouble on his hands. The crop of harvested sealskins in the Alaskan islands has been an unusual large one, and the demand for them on account of the mild weather has been limited.

This will give our very competent and worthy Secretary an opportunity to display his ability and resourcefulness in handling a surplus crop.

The Secretary has already taken the precaution of preventing the enlargement of the surplus, by ordering a reduction in the number of animals killed.

He can keep them in storage without cost. He has called to his aid a committee of prominent merchants to help in solving the problem of disposing of the surplus.

We believe that the Secretary will easily unwind this surplus ball; and it is not intended to cast a doubt on it by suggesting it might serve a purpose to add to the committee the Chief of the Weather Bureau.

FARMERS' SAFETY TOWER LIGHTS

AGRICULTURAL COLLEGES—EXPERIMENT STATIONS

Genuine Promoters of American Agriculture and Developers of Scientific Farmers

These great public partnership institutions are giving dignity to the avocation of farming and knowledge to the farmer of immense value. The farmer of small or large means has equal privilege of obtaining the product of the richest discoveries in science relating to agriculture and its advancement.

The agricultural college and experiment station go hand in hand in uplifting and aiding the discouraged farmer, whose soil has been overworked and underfed and weakened in its yielding capacity, by dispelling gloom and lighting up the way to recover strength and increase productiveness.

These grand "Tower Lights of Safety" have come to the rescue of many thousands just in time. Any successful process in connection with the improvement of the farm, or in the methods of farming, wrought out by a studious expert, is treasured experience. The professors, officers and operators work out these valued evolutions benefitting agriculture at the cost of the state for gratuitous use of the farming public.

A procedure that has been successfully tested and proven by one can be followed by another. It would be a shame and an appalling loss if such valued experience should be permitted to waste, because unknown to the farming public. There is a perpetual harvest garnering the golden grain of ripened experience.

The citizens of the United States recognize the tremendous importance of the farming interest as food producers of the country, to the prosperity and happiness of all the people. Any government or nation that neglects to realize this, as history has proven, will be a failure.

These institutions have back of them the State and the Nation, which give them the power and resources to handle and solve the hardest problems in their line.

Then, equipped with the highest professional talent, ambitious, energetic, courageous and with special aptitude for the various divisions in which they are trained with wise combinations, they are able to master the questions and subjects arising, for the benefit of the agriculturists, which no private individual could afford or would dare to undertake.

The colleges and companion stations are meeting the exigencies of the times by contributing a class of scholarly farmer graduates, to respond to the call on America, for food products in a manner that will elect, by the people's unanimous voice, these comrade institutions the benefactors of the human race and genuine "Farmers' Safety Tower Lights."

These colleges should be crowded with aspiring sons of farmers desiring to improve their condition and become versed in literature, and broader scholarship and knowledge, preparing them for an even start in the race for fame.

The skill and wisdom acquired by these young men will give us in time a brilliant and superior class of matchless farmers of the United States. Their marvellous exploits, improving the yielding power of the soil by doubling the production and in some instances redoubling it, will increase the wealth and the profits of the nation a hundredfold.

They will be imbued with new energies to improve their homes with comfortable, convenient and attractive buildings. Flowers, shrubs and fruits will ornament their lawns, pleasing the eye and filling the air with fragrance. Thus increasing the charms of the farm and the farm life will carry the rich cream of enjoyment and become the most desirable and appreciated homes.

It is a matter of history that thousands of the noted men in every age and class of livelihood, were born on the farm. They include statesmen, scholars, orators, poets, lawyers, physicians, ministers, artists, soldiers, inventors, mechanics, manufacturers, editors, etc., etc. The Agricultural College and Experiment Station will be the means of multiplying the numbers to reach success and fame through these channels.

The "Farmers' Safety Tower Lights" will bring about intensive farming and successful co-operation, in protecting the farmers' interest. Better citizenship, with more farmers owning their farm homes, as the knowledge will enable and fortify them to secure the ownership of their farms.

Hundreds of farmers' boys will read the foregoing, which gives a few of the merits of the great beneficiaries, the "Farmers' Safety Tower Lights." Those who have the spark of enterprise warm in their breast, will only need this hint to adopt the manhood course, where the opportunity offers them to take the first step on the ladder that reaches, by peristent work, to eminent renown and success. We should all be thankful to an Overruling Providence, that these Superior unexcelled opportunities, are accessible to our young people today.

FILLS A GREAT NEED

Walter K. Mahan, Rehoboth, Md., in sending in Christmas gifts to eight subscribers writes: —The Soil Improver fills a great need and I hold it in esteem. I want to keep a complete file of the magazine and I lack numbers 1 and 4 and would be glad to get them. Yours for better farming.

PROTECT THE FARMER INTERESTS

The matter of Muscle Shoals as a nitrate plant is being considered by Congress, and it is reported that the American Farm Bureau Federation are favoring it. Congressman Madden, who asserts his anxiety to procure for the farmers, both South and North, a cheap fertilizer.

Providence has wisely provided a valuable, needful soil fertilizer here at Muscle Shoals, as a natural resource, for the farmers' use in upbuilding and strengthening the productiveness of their farms.

It is the duty of Congress to protect the farmer's interests in granting a lease, or privilege, to parties or corporation that a limit on the profit or price per ton at which the grantee or successive operators may charge for the fertilizer, in order that the farmers may have the benefit of cheap product.

A reasonable small profit per ton will make a great business for the operators. The cheapness will enlarge the use of the product. The farmers are putting their trust in those who desire justice done the agricultural interests to guard their rights.

CONSIDERATION 1923 WHEAT CROP

The Laborer Is Worthy of His Hire

The most serious complaint of farmers for past season's crop was from those who raised wheat as their principal crop for market. It is evident that our farmers cannot compete with other wheat raisers in the European market, while a 30 cents per bushel tariff did not prevent Canadian wheat from being sold in our market. Canada has made a record for the world in production per acre of yield in 1923.

It is agreed that there should be a reduction in our wheat acreage from 62,000,000 acres down to 50,000,000 acres. If the 1923 wheat acreage in the United States had been 50,000,000 acres, the farmers could have controlled the domestic market and made their price for a fair profit at $1.50 per bushel.

The consumers, the great body of which are laborers, mechanics and workers in different industries, were receiving high wages, and this usually accompanies good times, as they are liberal spenders. This is no intimation that the wage earners were receiving higher wages than they should. It is only just that they should share in the success they were making for capital.

The wheat farmer should diversify but not forsake wheat, only decrease his wheat acreage. Most grain crops other than wheat are mostly fed on the farm.

The following is a report of Ohio farm sales for year 1922-23. They have made three groups:

Crops:	
Wheat	$ 31,000,000
Corn	17,000,000
Oats	6,000,000
Hay	7,500,000
Tobacco	9,000,000
Vegetables	14,000,000
Fruits	8,000,000
Forest products	5,000,000
*Miscellaneous	7,000,000
Total	$104,500,000

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*Legumes and seeds, rye, barley, forage, sugar beets, minor crops.

Live Stock:	
Cattle	$ 35,000,000
Hogs	57,000,000
Sheep	7,500,000
Horses and mules	8,000,000
Total	$107,500,000

Animal Products:	
Dairy Products	$ 75,000,000
Poultry and Eggs	37,500,000
Wool	6,000,000
Miscellaneous Products	7,500,000
Total	$126,000,000
Grand total	$338,000,000

These figures ought to be helpful to a special crop farmer in selecting his crops for diversifying. It will be noticed that dairy products lead; second, hogs; third, poultry and eggs, and, fourth, cattle.

WHY TEACH AGRICULTURE?

Question Is Asked and Answered by Dean F. B. Mumford

"But what are the chief reasons for the teaching of agriculture in the schools?" asked Dean Mumford of the Missouri College of Agriculture in his recent address before the State Conference of Vocational Agriculture Teachers. "There are two reasons above all others for teaching agriculture in the schools: First, the national welfare demands it because food and clothing come entirely from the soil, and because the spiritual resources of the rural population are essential for the constant regeneration of the cities. Second, the farmer cannot succeed without knowledge. This may be gained by costly experience or by systematic study in the schools. Increasing the farmer's efficiency through education is primarily of advantage to him, and secondarily to every other industrial and economic enterprise.

"The soil is the most fundamental, essential natural resource. All civilization is builded upon the primary essentials of food and clothing. Agriculture is the art which produces food and clothing from the soil.

"Human existence today, as in all past history, depends upon a successful agriculture. A successful agriculture is an agriculture adapted to the necessities of the age and time in which it is practiced. With advancing civilization, increasing density of population and the development of new needs and desires will come, also, greater dependence upon the soil and upon the rural population. A national development which results in rapid increase in the population and a continuously progressive decrease in soil fertility is a national menace. If such a policy continues for any considerable period, it will certainly lead to national disaster.

"It must be clear that in peace time or in war the production of the primary essentials of food and clothing is the most important fundamental occupation of mankind, and is, of all other industries, the one which should be, and in most countries is, fostered by the nation. In war time the nation that is able to control its food supply and provide abundantly for the needs of its armies and civil population, other things being equal, will be the victor.

"The business of production on the farm is the most important single industry in the world. In America it is the largest in respect to the amount of money invested and the largest in respect to annual income. It is the largest with respect to number of people employed in a single industry, and with all this it is capable of very great expansion and development.

"But the agricultural population itself is the most valuable element in our civilization. It is the most conservative, steadfast and dependable group; it is the most democratic; it is not easily moved by violence; it may be depended upon to provide not only the fundamental essentials of food and clothing, but perhaps more important still, it may be depended upon to provide those resources which are essential for the continuous regeneration of the city."—Endorsed by Editor Soil Improver.

BROOM CORN IN MISSOURI

W. A. Albrecht
Associate Professor of Soils

Broom corn is not such an extensive crop in Missouri, and occupied but 3,000 acres in 1922 and 4,000 acres in 1923, though this state is one of the four main broom corn producers. There are seventeen counties producing the crop, which gave a total of 840 tons, with a market value of $310,000, for 1922. The production occurs mainly in those counties bordering the south half of the western edge, approaching the Great Plains and Oklahoma area, where the main broom corn production centers, and where the sorghums—sisters of the broom corn—flourish. The yield in Missouri last year ranged from 250 to 1,200 pounds per acre, with an average of 560 pounds and a gross value of about $56 per acre. Recent interests in this crop have carried it into many of the Ozark counties with good yields, though the drought of the past summer has lessened the crop considerably for 1923, giving an average acre yield of 500 pounds.

The soil and cultivation requirements for broom corn are about the same as for corn, so that those soils growing the dent corn to maturity will serve. Broom corn is by no means a "poor land" crop and the yield of "brush" depends on the fertility. Deep, dark black soil usually produces a heavy, coarse fiber, while the chocolate or sandy soils give the finer fibers more suitable for carpet brooms. The soil should be as thoroughly prepared as for corn, giving a mellow, smooth seed bed, and planting should not be too early, or only after the ground has become warm. Many men prefer to plant it about two weeks after the corn is planted, or from May 15 to June 15.

Planting is done best with the ordinary corn planter, using a set of plates for grain sorghums, and putting the rows three and one-half feet apart for the Standard variety and three feet apart for the Dwarf variety. The rate of seeding will depend on the fertility of the land and will vary from one to two quarts of seed per acre, so as to put the plants from three to six inches apart in the row. Only on richer soils are the heavier seedings permissible. Control of the seeding rate in connection with the soil fertility determines the kind of brush. Thin stands on rich soil will mean long, coarse brush, while thick stands on poor soil will mean short brush or no brush at all. Getting the right stand is one of the "secrets" of the business.

Keeping ahead of the weeds is also one of the problems, since broom corn is a slow grower when small and is easily taken by weeds. The weeder or spike tooth harrow must follow the planter, and next the cultivator with care as soon as the rows are visible. From then on shallow cultivation should be frequent until the crop is about knee high or further cultivation is impossible.

Broom corn is about a ninety-day crop and harvesting begins at the close of the blooming stage. A delay in harvesting means brittle and stiff brush, so the quality of the product depends on the judgment of the producer as to the choice of harvest date. The taller varieties are "tabled;" that is, the stalks are broken down, but not off, at a height of three or four feet and laid diagonally across on the next row, leaving the head extend a foot or more beyond in ready position for cutting.

This is done to keep the brush straight. If it is not done, the fibers will be curled and twisted and it would damage the brush for making first-class brooms. The heads are then cut with some stalk left on them and piled on the "table" so formed. With the shorter varieties the heads are pulled by hand.

After harvesting, the seed is threshed or, in case of small crops, scraped from the brush. This is then cured, sometimes in the rick and sometimes in the shed. The curing process often determines the market value and care must be taken to prevent discoloration or molding. For this reason shed-curing is to be preferred, though it involves some additional outlay. After curing, the brush is baled into 300 to 400-pound bales and is ready for the market.

There are only three varieties of broom corn of any rate, the Standard, the Dwarf and the Acme. The Standard is tall and coarse, with a long brush, while the Dwarf is smaller, seldom going over six feet, and produces a shorter, finer brush, usually made into whisk brooms and brushes. The Acme is like the Standard in brush and the Dwarf in height, though not yet used widely. As a result of the variety differences, the Standard produces the heaviest tonnage per acre.

Broom corn production receives new impetus occasionally, though it labors under two serious hazards, namely, irregularity in its market and common overproduction. It has been increasing in the southwest, especially in Oklahoma and Texas, enough so as to move the central market from Chicago to Wichita, Kan., and increase the acreage in Missouri to no small extent. Much of the product is sold to small broom factories near the source of the brush, while many broom corn raisers prefer to make their own brooms and occupy the spare time of the winter in this way. No large co-operative factories have yet been developed in Missouri.

For the ambitious and industrious farmer who can under safe guidance gather the experience in growing this crop, broom corn offers a chance to diversify his farming and increase the "eggs in his basket."

STUDY EFFECT OF SOD ON GROWTH OF TREES

An interesting report recently coming to the attention of the Pennsylvania Department of Agriculture gives the results of several experiments conducted by the Cornell agrcultural experiment station to determine the effect on apple trees of the continuous growing of grass in orchards.

It was found by the Cornell officials that the grass caused a disappearance of the nitrates in the soil and injured the growth of the trees. Previously it had been held that the principal trouble was due to a difference in moisture content between cultivated soil and soil under sod conditions. The Cornell experimenters found, on the contrary, that moisture differences were a minor consideration and that the lack of nitrates was the factor of greatest concern.

WINTER USE OF LIME

There is opportunity to use lime with profit during fall and winter months on many Missouri farms, says P. F. Schowengerdt, soils extension specialist of the Missouri College of Agriculture. If their fields needed lime it should be applied this winter.

When applied as a top dressing on wheat, where clover is to be sown in the spring, lime will usually give good results, provided the soil is in need of lime, and a sufficient amount of high grade limestone is used. Such applications are best suited to lands that do not wash badly.

In this case the lime should not be expected to help the wheat crop; but will be of value on fields that are to be seeded to clover within the next year. An example of this is the field that was in corn this year and is to be seeded to oats with clover next spring. Here the application can be made to the stalk field any time when it is practicable to drive on the land. The usual disking down of corn ridges in preparation for oats seeding will serve to work the lime into the soil.

If desired, lime may be applied to a field that will be put in soybeans or corn next spring and followed by wheat and clover the next season. In this case the lime being applied about a year in advance of the clover crop, it is advisable to use an extra amount to make certain that the lime will hold over for the clover.

As the use of lime increases it will become more difficult for all farmers to secure lime just when they want it. This will necessitate the using of lime in winter when it can most easily be secured.

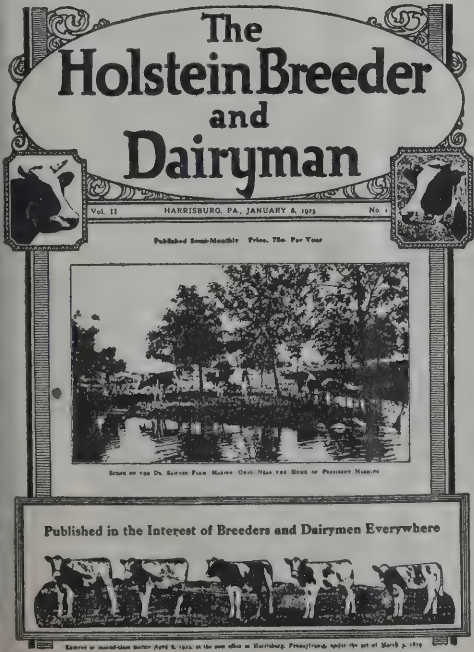
COMPLIMENTS ALFALFA

Missouri has 170,000 acres of alfalfa, the "Wonder Plant" of the farm world, producing four crops per year of the best hay—rain or shine, wet or dry, it seldom if ever fails, for it is the surest crop in the Corn Belt today. Missouri needs a half-million acres of alfalfa. This is not unreasonable when you stop to consider that we already have three million acres of other hay crops not so valuable as is alfalfa.—Mayes (Mo.) Paragraphs.

STOP THAT SOIL THIEF

While Farmer Pays for Deed, the Soil Washes Away

Hordes of gulleys now remind us
We should build our land to stay,
And departing leave behind us
Fields that do not wash away.
When our children pay the mortgage
On the place where long we toil,
They'll not have to ask the question:
"Here's the bond, but where's the soil?"—Exchange.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The achievemtns accomplished by them are inspirational to others. They produce new thoughts, broaden the views and electrify the ambition for greater work.

SCIENTIFIC FARMING BY FEEDING THE SOIL

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The Soil must be fed to yield maximum crops and retain its productive strength. It has been shown that it responds to proper feeding as naturally as an animal.

The farmers who will be most successful in the future are those who follow the scientific course of procedure as shown by the research and testing of the Agricultural Colleges and Experiment Stations.

The American farmer of energy and enterprise stands at the head of the progressive line of agriculturists. We can't afford to let others advance ahead of us. It is due from us now, to increase our average crop yields and to maintain our position in the front rank.

We have articles in each issue showing the character of feed necessary to produce plant growth. The Study Course, used by Junior Agricultural Clubs, have been valuable schooling. The editor of this magazine is sincerely interested in having our farmers turn their thoughts to the vital question of benefitting the Soil and at the same time profiting themselves. The farmer must use mind and muscle coopertively in the farm work for best results.

MAY WE HAVE THE ANSWER?

Will some professor inform us through this page whether the tapping of the Sugar Maple tree in the Spring each year, and drawing the sap for making maple syrup or sugar, is detrimental to the growth of the tree?

APPROVAL OF OFFER

We have received a number of letters from County Agents who inform us that they appreciate the offer and believe it can be made valuable and of real interest to the county agent. They cover six states.

AGENTS WORK

Nine Raised Ton Litters

Made Pigs Weigh 311 Pounds Each in 180 Days

To produce a ton or more of pork from one litter of pigs in 180 days is a real undertaking; yet this was done by each of nine men who were members of the Buchanan County Ton Litter Club this season, cooperating with the Extension Service of the Missouri College of Agriculture.

The club was started by Guy Q. McDaniel, county extension agent, with 55 litters nominated and the project was finished Nov. 24 with a genuine roast pig dinner—not one pig, but three. Representatives of the Chamber of Commerce of St. Joseph, members of the St. Joseph Stock Yards Company and townspeople were present to enpoy the dinner and to congratulate these men upon their attainment.

The project shows clearly the result of skillful feeding, for one pig weighed 311 pounds, says R. L. Waddell.

SAVE ON NITRATE PURCHASE

The purchase of 250 cars of nitrate of soda for county farm bureaus and a saving of $20.00 per ton is reported by the Arkansas Farm Bureau Federation.

Last Spring county farm bureaus paid approximately $70.00 a ton while the individuals paid $80.00 a ton.

Through the combined purchasing power of the state federation, nitrate of soda is delivered at from $48.40 a ton January delivery to $49.40 a ton March delivery.

MOST IMPORTANT STUDY

N. H. Gentry, the noted Berkshire breeder of Sedalia, Mo., writes: "I want to tell you how much I enjoy and am benefitted from reading 'BAYNES' SOIL IMPROVER,' in fact, I am going to school to it now. My life work in the main has been devoted to the breeding and improvement of live stock and I feel that I have not been an intelligent farmer in the proper sense, that of producing maximum crops and keeping the fertility of my farm up to the highest state. I deem this the most important study before the farmer of today, especially those living in the older sections and really none the less important to those living in the new sections. My farm has been in the family 104 years, the title of most of it having come from the government direct and, therefore, never in any other name and I am the third generation in ownership. The most of it is woodland Blue Grass pasture and was never plowed, but the remainder has been plowed too much. There is nothing of a business nature of more importance to me today, not even the improvement of my Berkshires and Short-Horns than building up and retaining the fertility of my land. May you prosper in this new publication of yours, for I feel that you will be the means through which many will be benefitted."

He seals his letters by enclosing four subscriptions to "Soil Improver" magazine to his farmer friends. Thanks for the compliment and good wishes, which are truly appreciated.

SWEET CLOVER

Sweet clover is a biennial and has but recently come into prominence as a forage and soil builder. In appearance, the plants when about half grown resemble alfalfa, though the leaves are larger and the plant has a bitter taste. When allowed to mature naturally, sweet clover makes a loose, bushy plant, 5 feet or more high, with small white flowers in slender racemes. An important characteristic of this plant is the very large taproot, which is powerful enough to penetrate stiff clay soils and in which a great quantity of reserve food is stored up during the first season's growth. Yields as high as 30 tons of green fodder to the acre have been recorded, but there is yet no adequate record of the relation between roots and tops. The composition of sweet clover is nearly the same as alfalfa, showing that turning under a good stand of this crop would furnish a large quantity of fertilizer for the succeeding crop. Sweet clover is, perhaps, the most important green-manure crop in parts of Mississippi and Alabama. It also is used for this purpose in parts of Kentucky, Illinois, Iowa, eastern Kansas, and western Ohio.

Sweet clover will thrive on almost any soil provided it has plenty of lime. In this respect it has a wider range of usefulness than either red clover or alfalfa, doing well on soils too poor to produce a crop of either of these two plants. It thrives in all parts of the United States. North Dakota is not too cold nor is Alabama too hot, and it will get along with less water and more salt in the soil than any other cultivated legume. Both hulled and unhulled seed in used, and the hulled seed is often scarified. The use of the scarified seed is recommended, especially when prompt germination is wanted.

The seed bed for sweet clover needs to be very firm, and good stands have been obtained by seeding on land so hard that the drill would barely leave a mark. On land that has never grown sweet clover the seed should be inoculated. When grown in the South, soil on which bur clover has grown may be used for inoculation, as the same organism inhabits the nodules on the roots of sweet clover, alfalfa, and bur clover.—Taken From Farmer's Bulletin No. 1250, U. S. Dept. of Agri.

WHY, FATHER!

Hill—When is your daughter thinking of getting married?

Will—Constantly.—London Answers.

FOUR KINDS OF BLUEGRASS

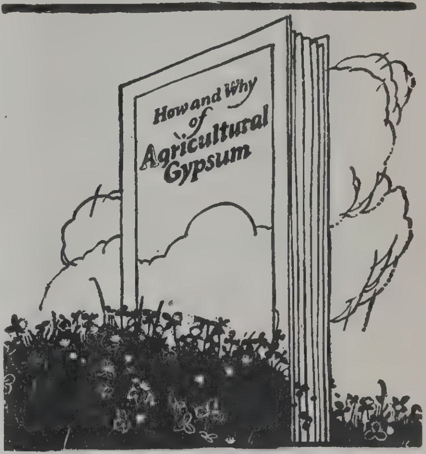
There are four kinds of "bluegrass," as follows: Common or "Kentucky bluegrass;" Virginia or "Canada bluegrass;" Texas bluegrass; and English bluegrass.

The Missouri State Board of Agriculture, through a ruling of its secretary, holds that "bluegrass" is not a sufficient label or tag under the administration of the state seed law. Too many cases of the selling of "Canada bluegrass" as "bluegrass" have been found, the dealer either honestly or dishonestly imposing on the customer, particularly because the Canada variety costs only from one-half to two-thirds as much per pound as the genuine Kentucky bluegrass, yet both are too often retailed at the same figure per pound. — Secretary, Mayes Clip Sheet.

American sheep clipped 228,000,000 pounds of wool last year.

STRONG ADVOCATE

J. R. Helfrich, Enon, Mo., sending in a club of subscribers for "BAYNES' SOIL IMPROVER," stated he got them to subscribe before leaving the post-office and indorsed the magazine by stating that if they did not find a single issue worth the year's subscription, he would pay the money back.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PLANTS IN SOIL BUILDING

It follows, then, that every kind of plant is a soil builder. The decay of the plant at once produces a change in the texture of the soil-making material. It is this condition of the organic matter—the dead plant—that produces this constantly performed miracle; for as the plant decays in the soil, the particles of soil in contact with it likewise decay. In other words, soil rotting is soil making. Decay of any material in the soil—organic or not—favors and induces the breaking down of the various complex compounds forming the rock, or the raw, or the untamed soils.

The addition of vegetable matter to the soil has assisted in soil making from the time that plants came first to the planet; it has increased the efficiency of all other agencies ever since the early days; and at the very present time it is the soil builder's best friend —its decay is essential to the feeding of plants.

The roots of plants have done their work in soil making. A great work it has been! For they have gone down deep into the soil making tiny channels for air and water; creeping into the crevices of rocks, they have continued their growth and their enlargement, in the end, breaking many rocks asunder, dislodging others from their beds—exposing all to the disintegrating influences of air and moisture, of heat and cold.

And roots—especially the small, fibrous ones—have a solvent action as well. The juice they exude at the tips, and the moisture with which they surround themselves, work a change in the soil particles between which they grow; limestone or granite or feldspar or mica slowly but surely succumbs to the deteriorating action of root life.

Animals, the modern soil makers—Soil making was considerably advanced when animals first made their appearance. But animals of all sorts have been potent workers in soil making, the higher animals largely by the manurial return to the land and the lower forms through the manurial effect, but also in directly affecting the physical conformation of earth.

For does not the ant seek the earth for its home and shelter, to construct there its house of many rooms, with the many tunnels connecting the dwellings of the nation? What are these homes and these tunnels but underground traps for air and moisture —soil builders?

Besides the work done in this direction, a tremendous quantity of earth is annually turned over and exposed to sunshine and rain, to heat and cold, to every influence concerned with soil making and soil improvement.

Every sort of insect or animal that burrows into the soil, that opens it, or loosens it, contributes not a little to soil making: the ant that builds there, the mole that tunnels, the prairie dog—or hedgehog that burrows, the earthworm that glides and crawls, and even eats and digests all are man's good friends in having had a hand in preparing the surface of the earth for the luxuriant growth of vegetable life.

The task of the earthworm—The task that has been the earthworm's is an important one. So simple are these creatures, so faithful are they in their labors, so undemonstrative in their duties, we scarcely give them a thought save the time when we seek them for bait for our fishing traps. But the earthworm has for ages been busy opening the soil to air and water, and even more: it eats the raw soil underground and plows its way upwards and downwards, casting at the surface the unused portions of its eatings. In doing this, the muscular gizzard of the worm is ever busy rubbing and grinding stony particles, mixing with these the organic matter taken into the body system; with these go the secreted slime that has a dissolving effect—useful in making subsoil and untamed earthy constituents available as food for plants.

As proof of the great good of these indefatigable workers, we have the evidence of a great student who after long study and observation declared that in many parts of England as much as ten tons a day of dry earth annually were passed through the bodies of these common worms of the field. He also calculated that as much as ten inches of the upper surface of the soil passed through the bodies of these common worms of the field. He also calculated that as much as ten inches of the upper surface of the soil passed through their bodies every fifty years. You can gather from this evidence what worthy workers these insignificant animals have been in preparing the earth for the habitation of man. The increased production of all products of the garden, or the orchard, and of the field has been due, in not a small measure, to these underground helpers and to these wonderful workers in soil making. —Soils, by C. W. Burkett, Orange Judd Publishing Company, 15 East 26th Street, New York City, Publishers, also of Standard Agricultural Books.

LEGUMES HELP FARMERS

For worn out soils, they furnish the cheapest fertilizers. They provide humus and nitrogen, and prepare the subsoil for air and water. Clover, soybeans, sweet clover, alfalfa and cowpea are among the first of the legumes. Every farmer should have a crop of legumes best suited to the soil grown every year. Legumes are the cheapest help for building up run down, poor fields and farms, they give nitrogen and humus, and open the subsoil to air and water. The cowpea will grow on very poor soil, perhaps better than any other legume. It is well suited for this purpose to start the weak soil back to health, vigor and strength. Don't overlook the economical point of the legumes.

LITTER IMPROVEMENT

Three years ago a litter of pigs weighing a ton at the age of six months, was heralded as one of the great discoveries of the age. The prize inducement offered for litters of this character, has been helpful in increasing the number of pigs in a litter.

It is easier to make the ton by feeding 12 pigs than nine. The ton litter is getting very common now in all the corn states and not confined to one breed. There are a number of litters weighing a ton and a half, in shows this year.

A GREAT DAIRY

George Burrell of Jefferson county, Missouri, herd of 13 Holsteins averaged 11,336 pounds of milk and 412 pounds of butterfat per cow with an average profit above the cost of all feed and pasture of $167.24 per cow. The profit on the dairy of 13 cows, $2,174.12.

ILLINOIS SYSTEM OF PERMANENT SOIL FERTILITY

(Continued from page 8, December)

The Elements of Plant Food: It is important that the plant be well supplied with food for maximum development. Frequently even a slight deficiency of plant food is the limiting factor of crop production. Moreover, the plant-food content of the soil is largely within the control of the farmer, and the supply of plant food in the soil may be completely changed by economic soil treatment.

There are ten essential elements of plant food, i. e., there are ten chemical elements out of which and by means of which the plant constructs its material. These elements are carbon, hydrogen, oxygen, phosphorus, potassium, nitrogen, sulphur, calcium, iron and magnesium; the chemical symbols of which are: C. Hopkins, Ca, Fe, Mg, which was the key given by Dr. Hopkins to his students as an aid in remembering them.

The great bulk of the plant—approximately 95 per cent—consists of three elements, carbon, oxygen and hydrogen. The carbon and oxygen are obtained by the plant directly from the atmosphere, while the hydrogen is obtained from the moisture. The supply of these elements is thus automatically taken care of by nature.

Iron is used by plants in extremely minute quantities in the production of chlorophyll, and as it occurs in the soil in large quantities it is safe to say that its supply will never become exhausted. There are only two instances known to the writer of iron having ever been added to the soil with economic results.

The plant demands for sulfur are rather large and the supply in the soil is comparatively small. Sulfur occurs in the soil both as organic and inorganic sulfur. The organic sulfur is slowly converted into inorganic sulfur by natural bacterial processes. Inorganic sulfur is soluble in water, and hence is readily lost from the soil. Fortunately, however, sulfur is added to the soil by rainfall in amounts sufficient not only to meet the needs of plants, but also to offset the loss by drainage water. Definite experimental data covering a period of seven years, obtained at the University of Illinois, show that forty pounds of sulfur per acre are annually brought to the soil in the rainfall.

There remain, then, five elements of plant food—calcium, magnesium, potassium, phosphorus and nitrogen—which must receive special attention in the construction of a system of permanent soil fertility. These elements are present in the soil in variable amounts, and a deficiency in one of them is often the cause of limited production. The elimination of this deficiency by the economic addition of some material containing the particular element in a form which the plant can use is the basis of the Illinois system. Such a deficiency can best be made up by adding to the soil the deficient element in the same natural form in which it occurs in the soil which the production of crops for countless ages has clearly demonstrated can be used by the plant.

Plant Food Requirements of Farm Crops: How can the plant-food requirements of farm crops be best determined? This is a fundamental question upon which authorities do not agree. With respect to carbon, oxygen and hydrogen, the question is easily answered, since these elements make the actual body of the plant and hence must be required in amounts found by chemical analysis to be present in the actual dry matter of the crop. But with respect to the other elements the question is not quite so clear. Iron does not occur as an essential part of the plant structure, yet iron is absolutely necessary for the production of the chlorophyll, or green coloring matter, of the plant. Is the amount of iron, for example, found in the plant by analysis actually needed or only tolerated?

It is quite evident that the amounts of the various elements found by chemical analysis to be present in the plant do represent the amounts actually removed by the plants from the soil, even though they may occur in the plant in excess of what is actually needed. In a permanent system of soil fertility, however, the only safe procedure is to make provision for the return to the soil of those essential elements actually removed by the crop, and at the same time to increase the amounts of such elements as are naturally deficient in the soil. The mineral plant-food requirements of some common farm crops, as thus determined, are as follows (expressed in pounds):

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Have shipped into 22 states with statisfaction that brings re-orders. Satisfaction guaranteed.
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LIGHT BRAHMA CHICKENS
PEKIN DUCKS
B. R. Turkey toms, June hatch at $10 each, nicely marked. Light Brahma cockerels, April hatch at $2 each and Pekin Ducks at $2 each.
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	Assumed yield per acre	Phosphorus	Potassium	Magnesium	Calcium	Iron	Sulphur
Wheat	50 bu.	12	13	4	1.0	.3	5.1
Wheat straw	2½ tons	4	45	4	9.5	1.5	5.9
Corn	100 bu.	17	19	7	1.3	.4	9.5
Corn stover	3 tons	6	52	10	21.0	4.8	7.6
Oats	100 bu.	11	16	4	2.0	.5	6.0
Oat straw	2½ tons	5	52	7	15.0	2.8	9.8
Clover seed	4 bu.	2	3	1	.5	....	....
Clover hay	4 tons	20	120	31	117.0	4.0	13.0
Total for rotation		77	320	68	168.	15.2	57.0

The foregoing figures represent actual facts which must be carefully considered in planning a permanent system of soil fertility. Furthermore, since these elements are obtained by the plant from the soil, a knowledge of the soil composition is of fundamental importance, in a study of this problem.

Plant-Food Content of the Soil: Various chemical methods have been proposed and used for analyzing the soil. Many of them are based upon the fantastical claims that they determine the "available" plant food in the soil. The use of such methods based upon such claims has caused chemical analysis of soil to be regarded in some quarters with a disrepute which is not deserved.

A chemical analysis of the soil is made primarily to determine the amounts of the various elements in the soil which may be drawn upon by the plant, just as a merchant takes an invoice of his stock in trade. Whether the plant food is properly used by the plant depends upon the farmer and his treatment of the soil, just as it depends upon the merchant whether or not his goods are sold or remain on the shelves. An accurate invoice of the merchant's goods for sale is a necessity for the successful merchant, and so is an invoice, or analysis, of the soil necessary for the successful farmer. The determination of the total plant food in the soil is therefore a prime requisite.

The chemical analysis of the various soils of Illinois shows that the soils vary widely in composition. This variation occurs not only among the different types, but also with respect to the several elements within a given type. The recent results published for Champaign county will illustrate the variation among types:

VARIATION IN CHEMICAL COMPOSITION OF DIFFERENT TYPES OF SOIL
POUNDS OF ELEMENT PER TWO MILLION POUNDS OF SOIL

Soil Type	Organic Carbon	Nitrogen	Phosphorous	Potasium	Magnesium	Calcium	Limestone
Brown silt loam	56,160	4,670	1,060	35,430	9,550	10,680	Required
Black clay loam	73,620	6,750	1,780	34,060	14,410	18,330	Present
Yellow silt loam	17,360	1,200	860	35,320	5,500	6,480	Required
Deep peat*	258,990	24,510	1,370	7,950	6,310	72,180	Present

*Results as pounds per one million pounds of soil.

These results for some of the typical soil types are very significant. It will be noted that the most limited element of plant food in brown silt loam is phosphorus, while the most abundant is potassium. The black clay loam is a much richer soil, in every respect, than the brown silt loam; while the yellow silt loam is a much poorer soil, being markedly deficient not only in phosphorus, but also in organic matter and nitrogen. The most striking characteristic of peat, next to its high content of organic matter, is the small amount of potassium.

The limited supply of some of the essential plant-food elements in the soils listed above may be emphasized further by calculating the number of years that a supply of the element would be available if no means were taken to replenish it. Such calculations have been made for the production of a hundred-bushel crop of corn, for the grain alone, with the results recorded below:

	Phosphorous Years	Potassium Years	Magnesium Years	Calcium Years
Brown silt loam	62	1,865	1,364	8,215
Black clay loam	105	1,793	2,058	14,100
Yellow silt loam	51	1,859	786	4,984
Deep peat	81	418	901	55,523

So far as the inorganic elements of plant food are concerned, these data clearly show that phosphorus is the most limited element in the soil and should receive attention first. As measured by plant requirements, magnesium is often more limited than potassium. In the case of peaty soils, however, potassium is markedly limited and is undoubtedly the controlling factor in crop production and should receive first consideration.—University of Illinois Agricultural Experiment Station. (Continued in February issue.)

OPTIMISTIC ON THE FUTURE

Chas. W. Morrison, secretary of Chamber of Commerce, Florence, S. C., has forwarded the editor the published address made by Hon. John Skelton Williams of Richmond, Va., at the annual dinner of their Chamber of Commerce.

This was attended by prominent men of the state and of other states. Mr. Williams served as Comptroller of the Currency through seven years under President Wilson and as ex-officio member of the Federal Reserve Board from the inception of the system in 1914 until two years after the conclusion of the World War.

Secretary Morrison states, "As much of it is so in accordance with the doctrines preached in your splendid magazine, I wanted you to see it."

The address is a lengthy one, highly interesting; it covers a varied and wide field. He is exceedingly optimistic over our country's future, in business and in development, as the world's greatest nation. Quoting him on this point:

"As a result of all knowledge and information I have acquired and of my study, analysis and observation, and from consideration of our history as a people, I desire to say to you emphatically that I am a constitutional, confirmed, stalwart, never shaken optimist on our whole country, but especially on our Southern States. With such vast and well-nigh unlimited material resources as we possess, you need have no fear for the future greatness and prosperity of our country, provided our people in all sections will remain true to the fundamental principles of our constitution.

"I find certain conditions among your farmers particularly encouraging. According to the last census reports from 87,000 farms in your state operated by their owners, 63 per cent are free from mortgage debt. You can understand that when you are told that in the conspicuously prosperous farming state of Wisconsin only 35 per cent of the farms operated by owners are free from mortgage debt.

"The farmers of South Carolina paid out more money in 1920 for fertilizers than those of any other state in the union—$52,547,000.

A way to help farmers around Florence would be to suggest to them to reduce the outlay for commercial fertilizers, and increasing the number of farm animals; urge them to secure a larger output of the finished product, also adopt co-operative marketing of products of the farm."

He is a strong believer in diversified farming: "There is a danger of having all our eggs in one basket. An individual may go through life knowing how to do just one thing and live to ease and prosperity in his old age, but he always is in more or less danger. So a community depending entirely on one industry or interest always is in peril from the changes and chances of commerce.

"Every effort of the agricultural department and of leaders of the agricultural interest is directed now to teaching farmers to diversity—not to depend on one crop. The lesson has been taught grimly and disastrously—away back when the coast counties of South Carolina depending on indigo gathered in great returns a few years and then went to smash; when Virginia and Maryland lived on tobacco and found themselves flat broke and with exhausted soil; more recently in other southern states depending entirely on cotton.

"There is much sense along with the tinge of humor in the monument to the boll weevil erected in an Alabama town, because the creature had forced the people to look to something else but cotton for their income. I can imagine a southern town, by the enterprise and vigor of its own citizens, establishing a number of small industries, requiring comparatively little capital, but much energy, watchfulness of detail and care of cost in the midst of a farming section, with each farmer applying the same principles in his work. Would it not soon become solidly and progressively prosperous?

"It is part of my work to study and know conditions not naturally familiar to the average business man, and I have noted with gratification the fact that South Carolina is one of the few states in the Union in which the number of farms is increasing steadily.

"I feel rather justified in being an optimist when I remember that in all the strain through which we have come we have been able to leave more than ten billions of dollars, owed us in Europe, to lie dormant rather than distress the people there by using our dominant power in pressure for payment, and have also poured out a billion dollars more to save millions of children and women and helpless men from suffering and death in the Near East, in Russia and Japan, and we have scarcely felt it."

FAIL TO BREED AND ABORTION

The breeders of swine have trouble and loss every year from these two causes. The editor of the American Swineherd (for 38 years), for 16 years, from 1906 to include 1922, the paper carried the advertisement of H. W. Kellogg Company, 948 Carroll Ave., St. Paul, Minn., for Kellogg's Cure for Abortion in Stock, after hearing from a number of leading swine breeders who had occasion to use the remedy, speaking in highest praise of the treatment of curing abortion and failure to breed in their herds of hogs. Other breeders upon writing us for advice where they had contagious abortion in their herd, were directed to use the Kellogg's remedy as one of the surest cures. We have had many reports of sows failing to breed after treatment that were fully cured and become sure breeders of good litters. The remedy is strongly endorsed by breeders as a remedy to be relied upon. While our information was principally from swine breeders, we feel as the remedy was originally prepared for abortion of cows in the dairy herds of Wisconsin, that the recommendations published in the 48 page booklet are just as strong for cure of cows, mares, sheep and goats for the same troubles.

The booklet is filled with much useful knowledge relating to these diseases. Every farmer should send for one, as they are for free distribution. Write H. W. Kellogg & Co., 948 Carroll Ave., St. Paul, Minn. Mention "BAYNE'S SOIL IMPROVER."

INCREASE IN SILOS

The Pennsylvania farmers are reported by Secretary of Agriculture of that state to have one per cent more silos on their farms in 1923, the number being given as 50,975. One-fourth of the farms in the state now have silos.

Acreage pledged to the new Minneapolis Potato Growers' Exchange has this week passed the 60,000 mark, according to an announcement made by the Minnesota Farm Bureau Federation. The membership now is in excess of 3,500.

PURE BRED POLANDS FOR SALE

CHOICE weanling pigs from our reliable Poland-China herd, priced from Twenty to Forty Dollars. Write for literature.

Please mention Soil Improver.

COX & CHAFA, KEITHSBURG, ILLINOIS

Service

"I keep six honest, serving men;
(They taught me All I Knew):
Their names are WHAT and WHY and WHEN,
and HOW and WHERE and WHO"
KIPLING

WHAT was the Declaration of London?
WHY does the date for Easter vary?
WHEN was the great pyramid of Cheops built?
HOW can you distinguish a malarial mosquito?
WHERE is Canberra? Zeebrugge?
WHO was the Millboy of the Slashes?

Are these "six men" serving you too? Give them an opportunity by placing

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in your home, school, office, club, library. This "Supreme Authority" in all knowledge offers *service*, immediate, constant, lasting, trustworthy. Answers all kinds of questions. A century of developing, enlarging, and perfecting under exacting care and highest scholarship insures accuracy, completeness, compactness, authority.

Write for a sample page of the *New Words*, specimen of Regular and India Papers, also booklet "You are the Jury," prices, etc. To those naming this publication we will send *free* a set of Pocket Maps.

G. & C. MERRIAM & CO.
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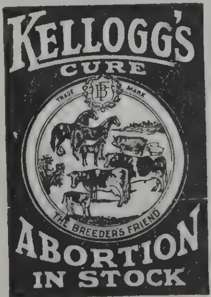
A Guaranteed Treatment
For Abortion and Failure to Breed



Purebred stock of all kinds—particularly hogs and cattle — are very susceptible to the disease commonly called Contagious Abortion, which may result in either Abortion or Failure to Breed. This disease can be permanently cured and thousands of prominent breeders testify to the success of the Kellogg Treatment. It is a guaranteed remedy for hogs and cows and is fed either in bran or salt, requiring no other attention. Excellent for all stock, keeping them in a healthy breeding condition. State number of animals and their general breeding condition when writing for our free booklet and price list.

H. W. KELLOGG CO.,
948 Carroll Ave., St. Paul, Minn.

QUESTIONS AND ANSWERS ON SOYBEANS

(1). Questions: Where did the Soybean, Sojabean, or Soyabean originate? Answer: It is a native of the Orient, and has been cultivated extensively since ancient times, and is now one of the leading crops of China and Japan.

(2). Who should grow soybeans in Missouri? Every general farmer in Missouri.

(3). Why? Because they produce well, and are among the very best feeds. They are wonderful soil builders, and they can be grown so many ways and in so many places, and in most all types of soil. Heavy sour clay soil is most unfavorable.

(4). In what ways may they be grown? They may be grown for seed or for hay or both. They may be grown in corn for silage, or for feeding off with sheep, lambs or pigs. They may be grown for pasture in many parts of the country after a wheat crop or an oat crop has been removed. Many Missouri farmers practice this. Sometimes they are grown to be plowed under for green manure. Sometimes they are sown between corn rows at the last cultivation, for the purpose of pasture, or for fertilizing the ground.

(5). When grown in the corn do they injure the corn crop? The average farmer will say no. The answer will depend on circumstances. They may do damage if planted too thickly. The number of seeds per hill should not be more than the number of grains of corn in the hill with them. If the soybeans do not gather nitrogen they would affect the corn the same as a weed would do.

The stand of corn seems to be the factor that limits the growth of soybeans. A heavy stand of corn means few, or no beans, while a light stand of corn may mean a fine growth of beans.

It would thus seem that we take no great risks at all, by the planting of the soybeans, but just add an item of safety.

(6). What is the advantage of having them in the corn? They add nitrogen and vegetable matter to the soil, add to the amount of feed grown, also add to the quality of the feed.

(7). How do they add to the quality of the feed? Corn, you know, is not a very well balanced ration, and it is low in protein, the most expensive food element. Soybeans are rich in protein, hence the two combined makes a most excellent feed, and a well balanced one.

(8). What do you mean by a well balanced feed? You are really out of order on the query, but since it is you, I will tell you that a balanced ration is one that feeds or nourishes all the body in the right proportion. Grow soybeans to take the place of tankage, that you have to buy. Where you use one pound of tankage, use instead three pounds of soybean meal. Soybeans have a little higher feeding value than alfalfa, and anybody most can grow them.

(9). How do you plant them in the corn? The best way I know of is with an attachment to your corn planter. There are attachments made for this purpose.

(10). How many per hill and how deeply should they be planted? Not more than as many soybeans per hill as you plant grains of corn. You must not plant very deep, as they may not come up. Many farmers have gotten poor stands by too deep planting. Two inches is deep for them; from one to one and a half inches will be better.

(11). How many soybeans per acre will be needed? That depends on the variety you plant. Seeds of some varieties, such as the Peking, are so small that by putting 3 per hill 3½x3½ feet a bushel will plant about 30 acres. A bushel of Mammoth Yellow, one of the largest, will plant from 12 to 14 acres.

(12). What do the seeds commonly cost? From $2 to $6 a bushel. Prices change with the seasons.

(13). If you plant between rows, when and how should that be done? You will need to lay your corn by a little earlier than you commonly do or the soybeans may make very little growth, and a one-horse grain drill, made for such a purpose, is the best way I know of. Stop up some of the holes, leaving open as many as you want rows. New Era cowpeas would be much better for this purpose.

(14). How many holes would you suggest be left open? I would say from two to three.

(15). Will a person always get good results by this method? No, perhaps 3 or 4 times in 5 you will get good results. Much depends on when you get them sown, on the soil and the season.

(16). How should they be planted to grow seed? Best on medium soil, well drained and drilled, about 28 or 30 inches apart, and one or two inches apart in the row. If the rows are closer the plants do not do so well, as they cannot stand crowding too much. Planting the rows closer requires more seed but does not produce more of either seed or hay. For hay they may be drilled solid with a grain drill at the rate of one bushel to the acre, but they do much better if cultivated.

(17). Oh, yes, I forgot to ask how much seed per acre is required for seeding for hay or seed? A bushel should plant from 3 to 5 acres, if drilled in rows. If drilled solid about one bushel to the acre is needed.

(18). What sort of soil is best? Light, sweet soil, reasonably fertile and free from foul weeds. Soils that are poor cannot be expected to give good returns until they are improved by fertilizing in some manner. Ground limestone and the phosphate fertilizers, or green crops pastured off or turned under, will help greatly in the poorer soils. While soybeans will do pretty well in most soil types, heavy, sour, poor, foul clay is the most unfavorable.

(19). Do they need to be cultivated? Yes, but it can usually be done with a harrow. The beans are deep rooted and do not pull up easily after they are 4 to 5 inches high. Harrowing about three times is usually enough. This, of course, will depend on the season, the soil, and how foul of weeds the land be. Always slant the harrow teeth back well and keep them clean, and be sure not to go into the bean field to work them when the ground is wet, or when the plants are even damp with rain or dew. WAIT TILL THEY ARE ENTIRELY DRIED OFF.

(20). What about pasturing the soybeans in the corn? You may turn lambs or pigs into the corn and soybeans when the corn is about ready to cut for fodder, and the soybeans are ripening. Pigs will not eat any corn except a down ear. Pigs up to 50 to 60 pounds may be used. Lambs and sheep will also eat the corn blades as high as they can reach and this is why they should not be put into the field while the blades are very green, as this may result in soft corn. Old sheep will eat some of the corn but they do not waste any, and how they do lay on the fat! It is a fine plan to let your fattening hogs and sheep right in the ripening corn and soybeans and allow them to harvest the entire crop. They save you hauling the manure back to the field, they get fat faster by doing their own feeding. They do not charge you 6 or 8 cents a bushel for husking your corn, they have more time for it than you do, and no doubt like the job better than I do. In hogging off corn only a small plot should be used at a time. You may have to do some temporary fencing.

(21), How many head per acre may be used? That depends on the size of the crop, and time you want to pasture the stuff, but of sheep a fair average might be from 8 to 10, and half as many more lambs, and hogs about the same. You know sometimes you like to get the pasturing done quickly and this, of course, must be considered.

(22). Would you feed the hogs tankage when they are feeding on soybeans? Why, no, soybeans come almost as near the value of tankage as does tankage itself.

(23). What about soybeans in the corn silage? Suppose your ground under fair conditions should make 30 bushels of corn per acre, or say, 5 tons of silage. In a crop of this size you can get from 1 to 3 tons per acre of the soybean silage in addition or a total of from 6 to 8 tons per acre instead of only the 5 tons of corn silage. The combination should have a feed value of perhaps 10 to 25 cents per ton more than the straight corn. This is considerably more than the seed will cost, and I have not here considered the extra nitrogen put into the ground by the soybeans. Then often a good pasture is left on the ground.

(24). What variety of soybeans would you recommend? That depends a lot on what use you mean to make of the crop. For the silo I like the Jet, the Medium Yellow, and the Mammoth Yellow. The Mammoth Yellow often will not mature seed as far north as central Missouri, but the other two will. These sorts grow tall and are also best for hav or pasture. Mongol is the heaviest seed producer that I have tried. The Morse is a favorite. The Mikado comes next, Medium Green is a fair seeder, matures rather early, but the plants are short. This is a good one for the pigs. The Ito-San is the earliest I know of and it is a very good sort. The Peking and Sable are very good also, and are said to do better in poor soil than most others. Ohio No. 9035 is a winner. The Virginia is recommended for thin lands.

(25). Are there any other varieties? Oh, my, yes, there are dozens of them. Among the best are the Wilson, Holly Brook, Early Black, Auburn, Morse, Virginia, etc.

(26). When and how should they be harvested other than pasturing? If hay only is the object a good time is when the pods begin to turn yellow or the lower leaves begin to fall. For seed the pods should be further matured and not fully ripe if they can be allowed to ripen after cutting. If allowed to be fully ripe the beans shatter badly sometimes. Some varieties are worse for shattering than others. The season also has something to do with this. Some machinery that will bunch them is best. They may also be cut with a binder and cured in the sheaf. A clover buncher on a mower is good, sometimes a binder is used, sometimes binding them and sometimes not. The old time self-rake reaper is fine for harvesting soybeans. When they are cut with a mower and left in the swath for a few days the stems settle among the stiff stubbles, and many beans will shatter and much of the hay will not be taken up with the rake.

(27). Does frost kill the green soybeans? Yes, thev should always be harvested before frost. Watch the weather some, too. They are rather hard to cure. Too early planting in the spring often causes failure also. Usually, corn planting time is about right.

(28). How much hay will they produce per acre? That depends on many conditions but perhaps from ½ ton to 4 tons, depending on soil, season and variety used.

(29). How much seed per acre may be expected? That, too, depends on the soil, season and variety. Field yields often run from 8 to 25 bushels.

(30). How does a bean crop compare with our oat or corn crop? Well, let's figure a minute. When corn is worth 60 cents for feed, soys are worth at least 90 cents. Soil that will grow 40 bushels of corn per acre should grow 16 bushels of soys per acre. Suppose the growing of the two costs the same, while in fact to grow the acre of corn will cost more.

40 bushels of corn at 60
would give us..........$24.00
16 bushels of soys at 90
would give us.......... 14.40
and we should get at least
1 ton of hay at......... 10.00
and the corn stalk field at. .50

would give us 10 cents in favor of the 40 bushels of husked corn. But wait a minute. I was about to forget to tell you that the beans should leave from $3 to $5 worth of fertility in the acre of your soil.

(31). What uses have soybeans, if any, besides feed for live stock?

(Continued on page 23)

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Name..........

Address..........

American Farm Bureau Federation News

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

FIFTH ANNUAL MEETING

American Farm Bureau Federation

December 10, 11 and 12

The convention was opened by an invocation asked by Silas L. Strivings, this was followed by the President's address in which he squarely put up to the directors their task. Secretary, Treasurer and Steering Committee reports followed the President's address.

In the afternoon of the first day, Henry C. Wallace, Secretary of Agriculture, talked to the convention, largely regarding the packers and stock yards administration. H. W. Moorhouse, Director of Research, made a report on agricultural research, and there were other speakers.

O. E. Bradfute re-elected president; J. F. Reed, vice-president; John W. Coverdale, elected Secretary.

O. E. Bradfute was unanimously re-elected president of the American Farm Bureau Federation Wednesday afternoon, December12, in the Sherman Hotel, Chicago.

Mr. Bradfute was nominated by E. B. Cornwall, of Vermont. No other nominations were made.

Following the election of the President, Edw. A. O'Neal, of Alabama, placed J. F. Reed, of Minnesota, in nomination for vice-president. Mr. Reed was unanimously elected.

Immediately after the election of the vice-president, the directors of the various regions placed in nomination the names for the executive committeemen from their section.

For the Western section were nominated and elected on the Executive Committee, A. C. Hardison, Santa Paula, Cal., Frank Evans, Salt Lake City, Utah, Chas. E Gibson, Hooper, Colo.

For the Eastern section, Geo. M. Putnam, Concord, N. H., Frank M. Smith, Springfield Center, N. Y., S. McLean Buckingham, Watertown, Conn.

For the Southern section, E. P. Cohill, Hancock, Md., Edw. A. O'Neal, Montgomery, Ala., W. D. Farris, Ennis, Texas.

For the Central section, C. E. Hearst, Cedar Falls, Iowa, S. H. Thompson, Quincy, Illinois, Ralph Snyder, Manhattan, Kan.

Of the twelve members on the Executive Committee, nine are new.

Three hundred and seventy-nine delegates from thirty-seven states in addition to several hundred visitors took part in the fifth annual meeting of the American Farm Bureau Federation which was held in the Hotel Sherman, Chicago, December 10, 11, and 12. The largest delegation was from Illinois, from which state eighty-one registered.

The fifth annual meeting has been characterized as a working convention. It was on the job promptly at ten o'clock Monday morning and stayed steadily at work until its adjournment at ten-forty Wednesday night, December 12.

The announced program of the annual meeting was followed to the letter, no cancellation or changes were made.

CREDENTIAL COMMITTEE SEATED 52 DIRECTORS

Fifty-two voting directors representing thirty-four state farm bureau federations, were seated by the credentials committee of the fifth annual convention of the American Farm Bureau Federation.

The states represented together with the names of the voting directors follow:

Alabama—Edw. A. O'Neal, Montgomery; W. G. Peebles, Mooresville.

Arizona—C. S. Brown, Phoenix.

California—A. C. Hardison, Santa Paula; W. H. Walker, Willows.

Colorado—Chas E. Gibson, Jr., Hooper.

Connecticut—S. McLean Buckingham, Watertown.

Delaware—Frank F. Yearsley, Marshalltown; Alternate, Robert J. Allen, Seaford.

Illinois—S. H. Thompson, Quincy; Henry McGough, Maple Park; Chas R. Finley, Hoopeston; D. J. Holterman, Sadorus; Curt Anderson, Zenia.

Indiana—W. H. Settle, Petroleum; John Napier Dyer, Vincennes; T. I. Ferris, Pleasant Lake.

Iowa—C. E. Hearst, Cedar Falls; J. N. Horlacher, Storm Lake; E. W. Houston, Dunlap; Mrs. Ellsworth Richardson, Pella; C. F. Coverdale, Delmar.

Kansas—Ralph Snyder, Manhattan.

Kentucky—E. H. Woods, Bowling Green.

Maryland—E. P. Cohill, Hancock.

Massachusetts—Howard S. Russell, Wayland.

Michigan—W. E. Phillips, Decatur.

Minnesota—J. F. Reed, St. Paul; J. S. Jones, St. Paul.

Missouri—Mrs. W. O. Redford, Warrensburg.

Montana—A. H. Stafford, Bozeman.

Nebraska—Harry L. Keefe, Walthill.

Nevada—W. A. Hardy, Fernley.

New Hampshire—Geo. M. Putnam, Concord.

New York—Enos Lee, Yorkton; Frank M. Smith, Springfield Center.

Ohio—L. B. Palmer, Columbus; C. Henry, Hebron; Harry G. Beale, Columbus, Depew Head, Marion.

Pennsylvania—J. C. Brubaker, Liltz.

South Dakota—Geo. A. Starring, Huron.

Tennessee—J. F. Porter, Columbus.

Texas—W. D. Farris, Ennis; Harry Williams, Mesquite.

Utah—Frank Evans, Salt Lake City.

Vermont—E. B. Cornwall, Burlington.

Virginia—G. F. Holsinger, McGaheysville.

Washington—Soren Sorenson, Ellensburg.

West Virginia—J. B. McLaughlin, Charleston.

Wisconsin—Geo. W. Hull, Whitwater.

Wyoming—Thos. J. Brough, Lyman.

TOO GOOD TO PASS UP

C. C. Burkhart, Mendota, Ill., writes: "I found one of your magazines, Baynes' Soil Improver, on the Chicago & Alton train when going to our Illinois State Bee Keepers' Convention at Springfield, Ill. Upon reading, it proved such a nice snappy paper and along the lines we are deeply interested in, so I am sending in a year's subscription, as it is 'Too Good To Pass Up'. "The growing of Sweet and Huban Clover as most of us bee keepers who are farming and thoroughly interested in Soil Improvement, especially in Northern Illinois where some of our farms have been farmed for 50 years and over, and are pretty tired and hungry for lime. phosphate and clover to get results. I am having a number of samples of Soil now tested at Urbana am now waiting for reports." Mr. Burkhart is also a dealer on Main Street, Mendota. Illinois, in Optical Goods. Bee Supplies, Cameras, Photographic Lenses and Evinrude Boat Motors.

Honey is another product that farmers can use to add to their inventory of articles in diversifying.

FARMERS' WEEK

The College of Agriculture extends a cordial invitation to the farmers of Illinois and to all others interested to attend Farmers' Week, University of Illinois, College of Agriculture (Urbana-Champaign), and join in a few days' study of the big questions in agriculture.

Farmers' Week is designed to give busy farmers a favorable opportunity to secure valuable information and instruction in subjects relating to farming and farm life.

The only expenses will be those of travel and board. There are no educational requirements and no registration fees.

Prominence will be given to the economic side of farming, that phase which has to do with marketing, efficient management of the business of farming and the planning of the farm as a productive and economic unit.

Seven different sections—Agronomy, Animal Husbandry, Dairy Husbandry, Farm Management, Farm Mechanics, Horticulture and Beekeeping—will each hold some fifteen class periods which will be devoted to lectures, discussions and demonstrations.

The new Agricultural Building will be dedicated during this week, and on Friday evening, January 25, the annual Farmers' Good-Fellowship Banquet will be the "round-up" feature of the meeting.

For detailed program to be issued at a later date and for other information address:

COLLEGE OF AGRICULTURE.

CENTER ATTRACTION

At the Missouri Centennial in 1921 United States Senator Henry L. Myers of Montana, formerly of Cooper County, Mo., said, "Missouri, in different ways, occupies a unique position; unique in geography, population, history. In the north she is called south. In the south she is called north. In the east she is called west. In the west she is called east. She combines the good of all of these. Missouri is in the center of the United States, and may be considered the center of the world and of the universe."

Contrary to popular belief, the word, "Missouri," never in the Indian tongue meant "Muddy River." In the Illinois dialect of the Algonquin Indian language "Wic-wes-Missouri" meant "birch bark canoe," and "We-Mis-su-re" was a wooden canoe or canoe fashioned from a log of wood. The Indians of Missouri were known as "the people who use wooden canoes," and Missouri originally meant "Wooden Canoe" instead of "Muddy River." Why not rightfully adopt the wooden canoe into the decorations and history of our state?—Mayes (Mo.) Paragraphs.

GREEN MANURING CHEAP FERTILIZING METHOD

"GREEN MANURING" means the turning under of green plants for the enrichment of the soil. Taken broadly, this would mean the turning under of weeds or the aftermath of a grass or clover crop, as well as a crop especially grown for turning under. Commonly, however, the term is used in a narrower sense and is applied to the turning under of a green crop grown especially for the purpose; or if not grown especially, at least used in that way rather than put to some other possible use, as when the second crop of clover is turned instead of being cut for hay or for seed.

With, perhaps, minor modification, the same processes are involved and the same results are attained whether the plant material is turned under dry or green.

Cover crops frequently serve also as green-manure crops. However, when a cowpea cover crop is allowed to remain until spring and the dead vines are then worked into the soil, this operation can scarcely be spoken of as green manuring, but is more nearly like turning under crop residues.

"Green manuring," therefore, as used in this bulletin means the turning under of any crop, while green or soon after ripening, for the purpose of soil improvement. While the turning under of crop residues serves to incorporate organic matter with the soil in the same way that green manuring does, economically the practice is very different. In green manuring, crops are turned under that might have been used for other purposes, while crop residues are commonly waste materials.

Green manuring is one of the oldest methods used to maintain or to increase the productivity of the soil. Green-manure crops were employed by the ancients,

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that you are all descendants of Adam, so we are going to tempt you with a taste of

THE DUROC JOURNAL
the livest and most read paper devoted to the interests of pure-bred Duroc Jersey Swine. If you are interested in raising the volume of productivity of your farm you should become interested in the farmer's greatest hog, the pure-bred Duroc Jersey.

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the Romans using lupines, which were sown in September and turned under in May for the benefit of the following crop. In Germany the use of lupines began in the middle of the nineteenth century and has proved an important factor in reclaiming the sandy lands of parts of Prussia.

In England both legumes and various crucifiers are commonly used, in India and Japan the farmers gather green plants of many kinds, sometimes even cutting twigs from the trees and carrying this material to their rice fields; in China green plant material is usually composted and then used, but it is also sometimes turned under in place.

In the United States the use of special green manure crops is much more general in the South than in the North. In the semiarid regions under dry farming green manures are not used, for reasons that will be made clear later, but under irrigation green manures play an important part in orchard culture in several Western states.

EFFECTS OF GREEN MANURING: When a green-manure crop is turned under, the various fertilizing elements that have gone into the making of the crop are returned to the soil, and a quantity of organic matter not before in the soil is added. This organic matter serves as food for microorganisms and also improves the physical condition of the soil.

PHYSICAL EFFECTS: Organic matter affects both the texture and the moisture-holding capacity of soils. Heavy clays are lightened and made more porous and sandy soils are enabled to hold moisture better. For the best growth of the roots of most crop plants both air and moisture are needed. When a stiff soil dries and becomes hard the air is excluded and the roots are likely to suffer not only from lack of moisture but from lack of air.

Clay soil containing organic matter is more friable than similar soil without organic matter. Where soil from which the organic matter has been extracted was allowed to freeze and thaw it remained compact and did not crumble. When the organic matter previously dissolved out of this soil was returned to it the soil crumbled after freezing, the same as the original soil.

Some crop plants, alsike clover and rice, thrive in a water-soaked soil, and wheat has been successfully matured in sealed pots from which air was excluded. In general, however, experience has amply shown that most crop plants do better when the soil in which they grow is in good tilth. This condition of good tilth is facilitated by organic matter.

Not only do the higher plants grow better in a soil rich in organic matter, but the activities of the soil bacteria are largely dependent on the supply of decaying vegetable matter. These bacteria need food and air. Their food is the dead vegetable matter, which they break down and thus make available to the higher plants. Most beneficial bacteria use air, and this they find more abundantly in a soil supplied with organic matter than in stiff clays poor in organic matter. In sandy soils there is air enough, but the addition of humus helps to hold moisture and so benefits the bacteria as well as the higher plants.

It has been shown that while 100 pounds of sand can hold only 25 pounds of water and 100 pounds of clay 50 pounds, the same weight of humus or decaying organic matter will hold 190 pounds. A good physical condition of the soil, therefore, largely depends on the organic matter in the soil.

CHEMICAL EFFECTS: The soil in which plants grow must not be thought of as a layer of dead matter in which the plant roots are fastened and from which they draw such substances as they need for growth, but rather as a very busy chemical and biological laboratory.

Besides the elements that plants need, there are many other substances in soils, and changes are constantly going on which make the needed elements more or less soluble. Sometimes these processes develop harmful substances, which in turn may be made inert by other reactions. These interactions would take place to some extent if there were no microscopic plants or animals in the soil, but, as a matter of fact every reasonably good soil is full of bacteria, molds, and minute animal forms. These cause changes that affect crop plants, usually beneficially, sometimes harmfully. Of all these organisms, certain species of bacteria are the ones most useful to crops, and these bacteria live, multiply, and work best when there is plenty of organic matter and enough air and moisture. This organic matter may be supplied by stable manure, by crop residues, or by green manures.

Green plants turned under must decay before they can be completely used by the next crop. Decay is brought about mainly by bacteria and fungi, and the process is somewhat complex. Eventually, however, the mineral substances are set free, and it is an important fact that the phosphorus and potassium derived from decayed plants are more readily available for the next crop than are substances when derived from mineral soil particles.

The proportions of mineral ash materials in crop plants vary, but are in no case large. Since the quantities present in the green-manure crop are only those previously taken from the soil, the turning under of green manures must not be expected to take the place of desirable additions of phosphate, potash, sulphur, or lime. In the decay of plant tissues acids are produced, and these acting on the soil render parts of the mineral foods soluble. —Taken From Farmer's Bulletin, No. 1250, U. S. Dept. of Agr.

POOR FINANCE

"John, run out for the doctor."

"Whaffor?"

"The baby just swallowed a nickel."

"What's the use of spending $3 to get back a nickel?"—Louisville Courier-Journal.

NOT A SPECIALIST

An old-fashioned practitioner is a doctor who can lance a boil without a nurse and two assistants.—The Duluth Herald.

PENNA WHEAT ACREAGE

The Pennsylvania farmers have reduced their wheat acreage back to normal pre-war status. Their statistics show the average December price of wheat 1869 up to 1922. The lowest price during that time was in 1899 at 66 cents, the highest was in 1918 and 1919 at $2.16 each year.

EXPERIMENT STATION ADVICE

The Experiment Stations in the corn belt favor the use of finely ground Rock Phosphate for the phosphorus. They all believe in the necessity of fertilizing to build up the soil. The question which they are determining by their experiments is to get the most economical feed to produce the results desired.

This makes it valuable to know the condition of the soil and its needs. The State Agricultural Departments are adding each year to the Soil surveys which give the analysis of the condition, which knowledge is a valuable asset to the farmers of each county. And many farmers send specimens of their soil for analysis to their state boards of agriculture.

The Experiment Stations do not favor using a commercial fertilizer claimed to meet fully all the needs of the Soil of every section.

Where farmers have by exprience found a fertilizer that furnishes them results that are profitable, it is good to follow until something better is secured.

The Illinois System of Permanent Soil Fertility states in the use of finely ground rock phosphate, "Various forms of phosphorus, such as raw rock, acid phosphate, bone meal, and basic slag, are available for use in agriculture. The Illinois system makes abundant use of the raw rock phosphate, since it is fully as effective and considerably cheaper per unit of phosphorus than either of the other forms, thus permitting a greater net profit to the farmer from its use where phosphorus is actually necessary."

MISSOURI SOIL SURVEY

The Missouri Soil Survey was organized in 1905, but actual field work was not started until 1907. The work is carried on by the Missouri Experiment Station in co-operation with the United States Bureau of Soils, the expenses being shared equally. The survey is made by counties.

Up to the present time surveys have been completed in 52 counties, distributed in all parts of the state and representing more than one-half the area of the state.

Briefly stated, the soil survey is essentially an inventory of the soils of the state. It is an investigation of the state's greatest natural resource. The soil survey work consists in field observations to determine the location and general character of the various soil types found in Missouri. The adaptations, utilization and deficiencies of each soil are carefully studied. An attempt is made to examine the soil to a depth of three feet on every 40-acre area, and where the soils are very complex on every 10-acre area.

FERTILIZER TANKAGE NOT FIT FOR ANIMAL FEEDING

Pennsylvania farmers are advised by the chemists of the Pennnsylvania State Department of Agriculture to be cautious in their purchases of tankage for feeding purposes and to make sure that they get a high grade brand free from re-worked animal refuse materials.

There are two kinds of tankage. The higher grade of material consists for the most part of meat residues and is usually safe to use as a hog feed or as an ingredient in poultry mashes. Reclaimed meat refuse containing paunch contents and all the residues of the animal, mixed together and processed, makes a good fertilizer tankage but under no circumstances, say the state chemists, should it be used as a feed.

CORN BREEDING

E. W. Lindstrom

CORN BREEDING is a source of both pride and profit to many enterprising farmers.

The local breeder of corn is always needed despite the well develeoped federal and state experiment stations and reputable seed companies that are constantly breeding corn. This crop demands constant breeding to adapt it to different parts of the state and especially to keep the variety pure. Since all this cannot be done by the state experiment station, some local breeder must develop reliable seed corn for his neighborhood.

Selecting the best ears in the field is a simple method and is economically done although there are many complicated systems.

The ear-to-row method, the ear-remnant methods, or the method of using hybrid seed are probably impractical to the average corn breeder at this time. Information and help in any of these methods can be had from the Agricultural Experiment Station at Madison.

Some corn breeders whose breeding stock produced a high proportion of white seedlings or have worried about diseases and insects in their soil. None of these treatments, as a matter of fact, affect in any way the appearance of the ordinary white seedlings and only when the cause is found can the situation be handled wisely.

A study of the heredity of the corn plant often answers many questions about corn. Breeding is based on a knowledge of the inheritance of characters and qualities. This in itself is a fascinating subject and has considerable importance from the commercial standpoint. The corn breeder, the county agent, and the agricultural teacher must know something of the way in which characters are transmitted or inherited in order to deal with plant breeding intelligently.

The corn plant is well adapted to a study in heredity. First, there are large numbers of different types of corn, such as dent, flint, sweet, pop, flour, red, white, yellow, purple, podded, and a score of other types; and second, corn is easily cross bred. The crossing of corn, which is its natural method of pollination, is

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so important in breeding work that it should be well understood.

Corn is naturally cross-pollinated. It differs in this respect from wheat, oats, barley, peas, beans, and soybeans, all of which are naturally self-pollinated. The wind blows the corn pollen about, sometimes as far as half a mile, scattering the pollen so that it falls on plants other than the one producing it.

In corn, the male element, the pollen, is produced in the tassels while the female element, the eggs or ovules are borne on the young cob. Each normal healthy corn plant produces over 2,000,000 pollen grains and about 500-1000 ovules.

To produce a normal ear of corn, at least one pollen grain must fall of each silk, grow down this long thread-like affair and finally fertilize the ovule or egg at its base. This soon produces the young embryo plant seen in the corn grain, as well as the starchy food material surrounding the young plant, each fertilized ovule producing a single kernel. If any of the silks fail to receive pollen, or if for any other reason the ovules fail to develop, there is a corresponding deficiency of kernels. This condition is commonly seen at the extreme tip of the ear.

Because of the distance between the tassel and the silks on a corn plant (from 2 to 4 feet) and because the pollen is very light in weight, there is much chance that the plant's own pollen will be blown aside and that the silks will be pollinataed by pollen from another plant. This is what is meant by cross-pollination. Sometimes, the pollen matures at slightly different times from the silks, a fact which also aids cross-pollination.

Cross-pollination makes corn breeding difficult. The mother plant can be controlled by saving its seed, but the male contribution is always uncertain. Experience shows that the male plant has as much effect on the progent as the female, and accordingly it cannot be neglected.

Pollination can be artificially controlled by bagging the plants. This is, however, impracticable as an ordinary corn breeding method.

IMPROVEMENT OF CORN by modern genetic methods is too complicated to be practicable for the general farmer, but must be left to the special plant breeder or trained seed grower.

However, for the average corn breeder, who does not wish to experiment, the most practicable method of maintaining quality and possibly of effecting some improvement is the one of ordinary selection. Selection of good seed ears in the crib is less effective than field selection. The breeder must get out into his seed field just before harvest when the ear husks are beginning to show brown. A large number of the best looking ears borne on the best plants are harvested and then husked and dried. In the field selection, those plants that are lodged, prematurely brown, poorly colored, with poor tassels, with smut or with any other disease or abnormality should be avoided. After husking the ears any poor ones can be discarded. It is possible to save corn seed for two years (even three years if properly stored). Accordingly, it is wise to select enough seed for several years. This is especially true, if frost is likely to destroy the seed crop in any one year.

Taken from Bulletin 356, Agricultural Experiment Station, University of Wisconsin, Madison.

SAVE VALUABLE BY-PRODUCT

Fertilizer Produced in Hog Feeding Has High Value

One of the valuable by-products of hog feeding that may be turned to the profit of the farm is the manure, though it is too generally neglected. Where hogs are fed concentrates, their manure is one of the most valuable fertilizers produced on the farm. There are three principal ways by which the manure from hogs may be returned to the land; by pasturing the feed crops, by establishing feed yards, and by hauling the manure to the field.

When possible, the first method is usually most practical and requires least expense, says F. L. Duley of the Missouri College of Agriculture. Where crops of any sort are pastured by hogs the manure is returned directly to the land. This is one strong reason for hogging down corn, for it not only saves the labor of harvesting the crop, but requires no hauling of the manure back to the field, and entails no waste of fertility in transfer.

On many farms it has been found good practice to establish temporary feeding places in the pasture or field so that the manure will be deposited where most needed. This may sometimes cause a little extra labor in feeding, but it saves both the solid and liquid manure and reduces the amount of filth about the barnyard and minimizes the danger of disease.

When it is necessary to feed hogs in closed lots the manure should be collected and protected from the weather until it can be hauled to the field. There is probably too great a tendency to place the feeding pen on a steep hillside or near ditches where a large part of the manure is carried directly into the streams by heavy rains or lost through leaching. This may be an easy way to clean the pens occasionally, but it is extremely wasteful of fertility. As a rule, when hogs are lot-fed, practically all manure is lost. There was never a time when our soils were more in need of the fertility contained in manure than today, and every effort should be made to conserve that produced by all classes of livestock.—Missouri Agricultural College.

MANY FARMERS ARE TERRACING

Soil Saving Terraces Are Built in 16 Missouri Counties

Mangum terraces have been constructed on 21 farms in 16 different Missouri counties during the past summer and fall. These were all established as demonstrations, to show other farmers in the communities how the work should be done. The farmers are becoming much interested in this means of controlling soil washing, according to W. C. Boney, of the agricultural engineering department, and C. L. Dietz, of the soils department, at the Missouri College of Agriculture, who have been establishing these demonstrations. In several communities where fields were terraced last year the farmers have been so well pleased with the method, that they are making plans to terrace their entire farms.

The Mangum terrace is constructed to resemble a graded roadbed running across the slope of the hill. A series of such broad ridges are constructed at regular intervals from the top to the foot of the hill. All water falling on the ground between terraces, and not absorbed by the soil, collects above the terrace and follows a gradual slope around the hillside to the outlet where it is discharged. The velocity of the water is checked by the terrace and the greater part of the soil carried is deposited above the terrace. Owing to the retarded flow, the water does not have a very great eroding effect.

Under ordinary soil conditions in Missouri the terrace should be made 16 to 20 feet wide with a fall toward the outlet of about six inches in 100 feet. The terrace that is most nearly level is the best soil saver, but it is the most likely to break over.

Farmers interested in terracing to save their soil will find much practical help in Station Circular 98, entitled "The Mangum Terrace," published for free distribution by the Missouri College of Agriculture at Columbia.

(Continued from page 17)

The beans are used much for human food especially in the South and in China and Japan. They are very rich in protein, and one learns to like the flavor. They also produce a very fine oil, some varieties as much as 25 per cent, that has many uses for food, cooking and in paints. A refined soy oil is sometimes sold as "olive oil." When the oil is pressed out a cake is left that has a feeding value equal to cotton seed cake or linseed cake. In seven months of 1916, 151,000,000 pounds of soy oil was imported to this country. Why not grow our own? The oil is quoted at from 8 to 12 cents a pound.

(32). Will the beans always put nitrogen into the ground the same as clover? No, your ground may not be inoculated. One ton of soybean hay fed on the ground will return about as much nitrogen to the soil as four tons of the average barnyard manure.

(33). How can I tell when they may be doing my soil any good? Dig some of the plants up carefully and if they are gathering nitrogen for you, you will find little nodules on the roots much like those on clover roots, only considerably larger. Examine them for nodules when the crop seems to be about half grown.

(34). How can the soil be inoculated? By sowing soil from a field that has been inoculated or by inoculating the seed with bacterial cultures. The University of Missouri can supply cultures.

(35). Will it pay to inoculate? If the ground is not inoculated, beans cannot gather nitrogen from the air, and the ground is not benefited, and usually you get smaller yields of both hay and grain.

(36). Is soybean hay a good feed? As good as alfalfa.

(37). You have not said much about cowpeas. Do you not like them? Of course I do, but I like soybeans better for most purposes. They stand up more like a bush and are easier to harvest and to cure than are cowpeas. They can be safely planted earlier than cowpeas. Cowpeas can be planted from late corn planting up to the middle of July, but the very late planting could not be expected to make much but hay or pasture except as far south as the southern part of this state. The soybean is a much heavier seeder than cowpeas, and weevil do not molest the seed to any great extent. Soybeans can be threshed with a common threshing machine by running the power low, and using not to exceed one row of concave teeth. The machine will do best if the cylinder is run slower, and the other parts of the machine run at the regular speed. Cowpeas cannot be well threshed with such a machine. For planting between corn rows at laying by time, it is doubtful if anything will equal New Era or Whippoorwill cowpeas, and for turning under for green manure the Whippoorwill or Clay cowpeas cannot be surpassed. Cowpeas do better in very poor soil than will soybeans. By drilling about one bushel of either of these last two kinds with about 25 pounds of sorghum per acre, make a wonderful soiling crop, in the event of good soil and season.

(38). What do you mean by a "Soiling Crop?" A soiling crop is one to be cut green and fed fresh from day to day, and such crops as will sprout up again after being cut are most commonly used for such.

(39). Do insects molest soybeans badly, or what enemies do they have? Not many insects molest soybeans. Chinch bugs, army worms, and many other pests will not touch them. The rabbit is sometimes a serious enemy, as they are very fond of soybeans.—By Uncle Sam Jordan, Missouri Expert Corn Grower & Farmers' Institute, Practical Lecturer. From Illustrated Bulletin, November, 1921.

HAY LEADING PENN FARM CROP IN POINT OF VALUE

In proportion to the amount contributed to the total value of farm crop production in Pennsylvania, hay invariably leads with a value almost one-fourth of the total for all crops. Corn and wheat rank next in orders.

From a compilation recently made by the Bureau of Statistics of the State Department of Agriculture, it is found that in both 1922 and 1921 the total crop of hay in Pennsylvania was worth more than twice as much as the total wheat crop.

Last year the value of crop production on Pennsylvania farms was estimated to be $241,366,000; in 1921, $201,971,000, and in 1909, $153,472,000.

SECRETARY HOOVER SPEAKS

Hon. Herbert Hoover, Secretary of Commerce, says the world is over-producing bread grains and under-producing feed for the dairy, both grains and other animal feed that are milk and butter promoters.

The Secretary takes a broad world view of the situation, and his wide experience entitles his opinion to much weight and consideration.

QUARANTINE AGAINST ALFALFA WEEVIL

P. A. Glenn, Chief Plant Inspector, Urbana, Ill., is giving notice that a quarantine has been established by the governor of the state against the shipment of alfalfa hay from infected districts in Utah and Wyoming with an insect known as the alfalfa weevil, which is very destructive to alfalfa. This is an imported pest, being present in Europe, western Asia and northern Africa. It was first seen in the United States in a small field of alfalfa near Salt Lake City in 1904. It is now found over all of Utah and adjoining states. Thus far no trace of it has been found east of the crest of the Rocky Mountains.

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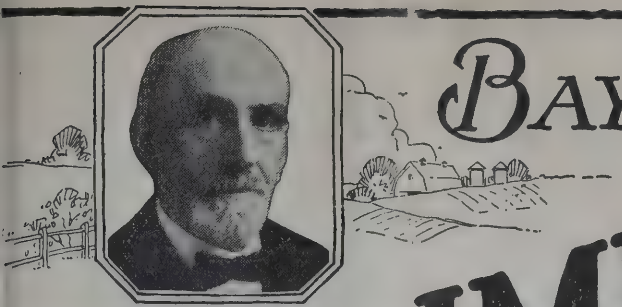

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A MAGAZINE

Devoted to larger crop yields

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ol. 1 FEBRUARY 1, 1924 No. 8

EXERCISE REASON

Every farmer with ambition to succeed, should strive diligently to attain the front ranks of the agricultural columns, and to hold the position with persistence.

While the opportunities and co-operative institutional aids for advancing the agriculturist, are at their highest point of excellence; success depends upon the individual. It is the sound thinking combined with the proper efforts of the person which endow him with success.

For the year 1924 is predicted by many distinguished successful business men, bankers and scholars of ripe experience, a bright outlook for business prosperity. The farmers are promised the best totaled results, since the deflation erasing.

Diversified farming has been studied in its various features, by the specialist and to some extent by most farmers. There will be an increased number favoring the diversified practice and an extension of the different methods, with greater variations. It is accorded that the business hazard is lessoned by diversifying.

It behooves our farmers to apply the benefits derived from science, in their farm operations; to secure the more bountiful harvests for the New Era.

The Soil should be fed scientifically, for maximum crop producing fertility, that its flourishing show, may impress the slow farmer of its importance.

Farmers should not overlook the fact that scientific farming is the true way, the economic, Nature's way. It is in the front where the progress is made, where the laurels are won and victory achieved.

Agriculture is the greatest of all industries.

All other industries depend upon agriculture.

Agriculture relies on the fertility of the Soil.

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TABLE OF CONTENTS

Page
Buckwheat Experience
Points on Red Clover Success
It Speaks for Success...... 2

Elementary Study Course
The Treasury of the Farm
Farm Manure 3

Forced a Home Market
Gives Good Advice.......... 4

EDITORIALS
Judge Future by Past
Cheap Farm Labor
Value of Experience
Don't Waste Your Reading 5

Weak Business Points
Diversifying Insurance
Red Clover the Wonder Crop 6

The Ten Cent Bread Loaf
Times Are on the Up Grade
Manure and Soil Improvement 7

Page
Average Farmer Loses on Manure
Seed to Get Good Sod
Soil and Crops
Sell Co-operatively
Principles of Soil Fertility.. 8

Effect of Tillage
A Farmer's Experience
Prepared Seed Bed—Successful Crop 9

County Agents Department
Success Feeding Soil
Big Tobacco Crop
Mich. Bureau Saves Farmers Half Million
A Brave Scholar
Kansas Turkeys............ 10

Valuable Instruction in Legume Inoculation......... 11

Value of Phosphates on Indiana Soils............... 14

Soy Beans Worth $30 Acre
Why Purebred Livestock
Appreciated Advice......... 16

Page
Sow and Cow Troubles
Facts About Cows
Adams County Gives Service 17

A. F. B. F. News
The Year 1924
Export Corporation
Increase in Members
A Record Week
Relations 18

Report Muscle Shoals Soon
Beet Growers Organize
Save Shippers $3,000
Egg Marketing Work
Refund $175,000............ 19

The Source of Supply of Sulphur in the Air........... 20

Balanced Crop
The Nitrogen Problem..... 21

Is Now a Famous Pasture
The Phosphorus Problem... 22

Farmers Slowly Emerging
Missouri Dairy-isms........ 23

BUCKWHEAT EXPERIENCE

J. L. Erwin, Fulton, Mo., a successful dairyman, in sending in a club of subscribers for BAYNES' SOIL IMPROVER, writes us his experience with buckwheat as follows: "Something over fifty years ago I cleared up a piece of new ground, and as was the custom in those days, planted it in corn. In the third or fourth year I found the young corn was alive with chinch bugs. I at once sowed it with buckwheat. These bugs won't eat buckwheat. The result was I raised a fine crop of buckwheat.

"There were no mills at that time to grind buckwheat. I used a small corn mill with horsepower, opening it so it would just hull the buckwheat. Then ran it through a wheat fan and blew out the hulls. Then set the mill close to grind the hulled buckwheat and had hot buckwheat cakes all winter.

"I have found that chinch bugs are not fond of a clover diet either. I have sowed clover in the corn the last time of cultivating it. It did well and made the bugs scarce either by immigration or death. They at least did not flourish."

POINTS ON RED CLOVER SUCCESS

We call attention to the article from R. H. McCown of Hopkinsville, Kentucky, in this issue, who has made a genuine success on growing red clover and it is the foundation of his prosperity as a farmer.

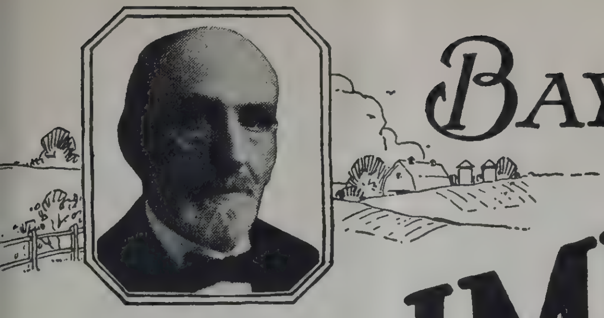
He carries out the sentiment, "that what is worth doing at all, is worth doing well." He has given our readers the benefit of his experience, of his ability to get a stand on poor land and improving it each year until it is his surest crop. It has proved for him a wonder crop, while others, who have not used the methods he has, become discouraged and have dropped it, because of their difficulty to get a stand. He further states that his treatment has responded with good crops through blizzards and drouths. He says: "The manure made the clover, the clover made the corn, and the corn made the Big Type Poland-Chinas of the best strains and they in turn made the money."

His plan was adopted after stu
tests, close observations of resul
until a successful system was for
ulated. This ripened, practical, su
cessful experience is generous
contributed through the "Soil I
prover" for the benefit of his f
low farmers. The knowledge
these facts is a valuable asset
any farmer, if he uses it.

IT SPEAKS FOR ITSELF

A copy of BAYNES' SOI
IMPROVER came into my han
through a friend's waste bask
I read it, and was highly pleas
with it. It is just what I ha
been wanting for some time.
was not presented to me by
solicitor, but it speaks for itse
It would be worth several milli
dollars to the United States
one-fourth of the farmers cou
read it a year. I hope ma
others may be as fortunate
get hold of one as I was.

The hens that molt or lo
their feathers late in the seaso
are usually poor layers. Ear
molting is an indication that t
hen is a good layer. Save t
eggs from early molters f
hatching.



BAYNES' SOIL IMPROVER

"MAKE TWO BLADES GROW WHERE ONE NOW GROWS"

l. 1 February 1, 1924 No. 8

HE SOIL CONTAINS THE FOOD ELEMENTS FOR PLANT GROWTH

e Treasury of the Farm—Study Course Used by Junior Agricultural Clubs

LESSON 9

Farm Manure

. Some men have estimated t the farm manure made in United States in one year is rth more than two billion dol- s, and that because of the way s handled, one-half of its value ost, which would mean the loss a billion dollars every year. Americans are a wasteful ple, as this big loss of plant d, from poor care of farm man- , goes to show.

. The production of manure m farm animals during one r, not including any bedding, as follows: 1,200 - pound rse, 11 tons; 1,000-pound dairy v, 13 tons; 1,000-pound steer, ons; 200-pound sheep, one and -fifth tons and 200-pound hog, ons.

. Depending on its nature the way it is used, farm nure on land is worth all the y from $1.50 to $3.00 per ton, more, to the farmer. In round mbers, the manure from a rse should be worth about $30 year; that from a cow, $25, d that from a sheep or hog, 50. This means that on a farm th five horses, six head of cattle, d 12 hogs, the value of the total nure produced in one year uld be about $350, if it could be saved and gotten back on land.

. Manure owes its value to organic matter, nitrogen, phosphorus, and potassium it contains. A ton of average stable manure contains 10 pounds of nitrogen, two pounds of phosphorus, eight pounds of potassium and is one-fourth dry organic matter and three-fourths water. Of the organic or dry matter in the original feeds, about two-thirds is used by the animal and one-third is recovered in the manure. Three-fourths to four-fifths of the nitrogen, phosphorus and potassium in the feeds given is recovered in the manure. When the right amount of bedding is used, one ton of feed will make about one and one-half tons of manure.

5. The value of manure is influenced to a slight extent by the age of the animal, more by the kind of animal, and most by the kind of feeds used. Manure from old, mature animals is a little more valuable than that from young, growing animals, because the young animals withdraw more of the plant food for permanent use in their bodies. Sheep manure is considered the most valuable per ton of the manure from the farm animals (except poultry), that from the horse next, from the cow least. Manure made when much rich feed is being given is much more valuable than that from animals being fed mainly on roughages, with the idea of simply maintaining them.

6. The value of the manure is both in the liquid and in the solid excrements. Nitrogen is contained one-half in the solid excrements, and one-half in the liquid; phosphorus, practically all in the solid excrements, and potassium, two-fifths in the solid excrements and three-fifths in the liquid. In a general way, the plant food value of manure is about half in the liquid and half in the solid excrements. This shows why it is so important that the liquid manure be saved. The organic matter is almost entirely in the solid excrements.

7. The loss of value in farm manure come about in a number of ways. Usually the largest loss comes from not saving the liquid manure, either by not using enough bedding to absorb it or else, even worse, by throwing the manure out into the barnyard and exposing it to the rains. Manure exposed in this way soon loses the larger part of its value.

8. To save all the liquid excrement, about one-fourth by weight as much bedding should be used as there is feed given. Any refuse vegetable material such as wheat and oat straw, cornstalks, etc., can be used for bedding. Not only does this save the liquid manure, but also it offers a good way of getting the bedding materials back on the land. The use of most bedding materials does not lower the value of the manure. Wheat straw, for instance, contains about 10 pounds of nitrogen, almost two pounds of phosphorus and about 20 pounds of potassium per ton, which is more plant food than would be contained in an equal amount of unbedded manure.

9. Needless to say, manure should never be thrown out into

the barn lot to be exposed to the weather and the rains. The Ohio Experiments Stations found that manure exposed in this way during the three months of January, February and March, lost more than a third of its organic matter and nitrogen, about a fourth of its phosphorus, and one-half of its potassium. There was but little loss in the actual weight, however, since water took the place of the material lost.

10. The New York Experiment Station found that two tons of horse manure exposed in the open barn lot for six months was reduced to less than a ton and that 60 per cent of the nitrogen, 47 per cent of the phosphorus, and 76 per cent of the potassium was lost and that the value of the manure was reduced from $4.82 to $1.68.

11. Even when not exposed to the rains but simply thrown out loose under sheds, there is considerable loss in manure. In this case, the loss falls almost entirely on the organic matter and nitrogen. That manure is losing in this way, can be told by its heating and by the ammonia smell. The Canadian Experiment Station found that manure exposed in this way for four months lost two thirds of its organic matter and almost half of its nitrogen. There was scarcely any loss of phosphorus or of potassium.

12. The easiest and about as good a way as any to save farm manure is to use plenty of bedding and leave it packed in the stable or feeding shed until it can be spread, which should be done as often as possible.

13. When necessary to move manure, as it is for instance in dairy farming, it should either be spread on the fields directly, or else repacked, kept moist, and the loss of its liquid contents prevented. Many dairy farmers have large, covered, concrete pits in which the manure is kept until it is spread on the fields. This is a very good way to handle it.

14. Some farmers have concrete floors in their stables and feeding shed to prevent the loss of any of the liquid manure at all. Such floors are expensive, but where large amounts are made, no doubt pay for themselves in a few years. Where not too much manure is made, it is better not to go to this expense, but to rely on the use of plenty of bedding and on spreading as often as possible.

15. Medium to heavy applications of farm manure; six tons or more per acre, should give best results applied on the land for corn and can be applied before or after plowing, though preferably before.

16. Very often light applications can be used to advantage on wheat land where clover is to be seeded the following spring, especially on land where it is hard to get a catch of clover, or to help give alfalfa a good start; or in a number of other ways. Light applications used in these ways should be applied after plowing.

17. Farm manure can best be applied with a manure spreader, but a spreader costs about $175 and it would not pay to own one unless there were 50 to 75 or more tons of manure to be spread each year. Where large amounts of manure are to be handled, the farmer should not be without a spreader.

18. Farm manure is one of the best fertilizers and the more of it the farmer can save and get back on his land, the better the crops he can grow. However, it is possible to keep up the fertility of land without the use of any farm manure at all by turning under legume crops and crop residues and by the purchase of phosphorus fertilizers. Even on farms where much farm manure is made, the fertility of land cannot be entirely kept up (unless large amounts of feeding stuffs are brought in from outside the farm) without the purchase and use of a phosphorus fertilizer, except on the richest soils of the Bluegrass region.

Questions for study: How much farm manure is made from the common farm animals? 2. what is the value of farm manure? 3. How much of its value is in the liquid excrement? 6. In the solid excrement? 6. Name the ways in which the value of farm manure is lost. 7, 8, 9, 10 and 11. How can the value of farm manure best be saved? 12, 13 and 14.

So, naturalists observe, a flea has smaller fleas that on him prey; and these have smaller still to bite 'em; and so proceed ad infinitum.

FORCED A HOME MARK

Two unmarried sisters li
on a fruit farm in Ohio, on
count of early frost, were for
to save the fruit, to put up a s
at front gate and erect a mar
ing stand to sell their fruit,
they added potatoes and o
vegetables, butter, eggs and p
try.

The farm was on a much t
eled road. The forced efforts
save their fruit proved suc
success that it was adopted
them as their method of mar
ing their products for the
two seasons.

They planted sweet corn, ve
tables, and with butter, e
poultry and their fruit sold
their real home market, in
years made sufficient to pay
their 80-acre farm. The frost
considered a damage at the ti
But it proved to be a frien
helper. Their wise endeav
to make the best of what t
regarded as their misfortune,
sulted in being a blessing.

This shows the advantage
buckling on their armor
bravely using good reasona
thoughts which brought th
the victory. If they had given
by moaning and worrying o
the damage, how different wo
have been the result.

GIVES GOOD ADVICE

Having recently subscribed
BAYNES' SOIL IMPROVE
O. W. Ruder, owner of a farm
Allegan County, Michiga
writes: "It is sure a magazi
much needed everywhere
farmers; I want to get from N
1 to No. 6, if possible, and
keep every one on file from t
time forward." This is good
vice from a farmer who is pr
ing it.

IT MAKES GOOD

T. H. Howes, the wideawa
West Virginia County Agent, i
forms us that the members
their Farmers Club at Crook
Run, all of whom subscribed f
BAYNES' SOIL IMPROVE
expressed themselves as w
satisfied with the magazine a
were making very good use of
They considered they received
great bargain.

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EDITORIALS

JUDGE FUTURE BY PAST

In looking back over the past years of the farmers' methods and plans of performing their work and advancing their standard as progressive agriculturists, we should get some facts beneficial to us for the present. The effort to promote the interests of the farm industry of the United States has been one of continual development since the days of the introduction of the mower and reaper. This was brought about by individual genius and enterprise, the necessity for the machines had arrived to relieve hand labor, and they were supplied.

As the farm requirements expanded and grew they were furnished by those apparently who were waiting to provide them. The county was well fitted out with the character of people to insure success. Thus it has been a succession of varied implement and machinery to fill the needs of the time.

The agricultural college and experiment station investigation and research are weaving scientific principles into the agriculturist's knowledge. This gives him superior ability and is a valuable quality which enlarges his capacity and is greatly appreciated. When the time was reached for the indispensable silo, they were adopted and rapidly spread over the country. The dairymen especially were helped tremendously both in saving feed, reducing its cost and in its superiority as a milk and butter producer.

Upon examination it will be found that there were periods of marked depression in the feeling of the farming community quite frequently prior to some new development and encouraging change of feeling.

There never had been a time in the history of agriculture when the industry was more highly esteemed by the good citizens of the nation than the present time.

The present endeavors to forward agriculture on many roads by government institutions, private bodies and individuals has never been exceeded. They are pursued with the ardor and real vigor of true discoverers. Judging from the past, the time is ripe for a momentous change in behalf of agriculture and proving a real benefit and greater profit to the farmer. It is likely to be aided by a more general adoption of scientific farming and securing the numerous advantages accompanying the skill of the scientist. Another pronounced aid will be through the American Farm Bureau Federation from the co-operating plan of orderly marketing the farm live stock and products. Also in the general diversifying by farmers and less specializing on a single crop. Besides the improvement of the fertility of the soil for plant growth to produce maximum crops will be more practiced. The agricultural colleges with related institutions and vocational schools will graduate a largely increasing number of scientific farmers each year.

CHEAP FARM LABOR

Every farmer can secure the advantages of the cheapest labor in fertilizing the soil, through the growth of some character of legumes.

The legumes are a specially favored crop with farmers that once get started right. No farm should be without two or three of the legumes that have been found best suited to their soil.

The legume works by drawing nitrogen from the air to the soil, thus fertilizing the field. It is understood by every farmer who has knowledge of legumes they or the soil should be inoculated.

Alfalfa, red clover, soybeans, sweet clover, cowpeas, rape and others of the legume family are used for both pasture and hay. The farmer making a success has a preference for those he has succeeded with.

The labor of the legume is also secured by the farmer by the planting with the last or next to last cultivation of a field of corn with soybeans or cowpeas. Then when corn is matured, they hog it down, thus furnishing a varied good hog feed for gains. It saves labor in gathering and husking the corn. The soil is benefited by fertilizing from the feeding upon it also.

VALUE OF EXPERIENCE

The experience of successful farmers is valuable knowledge; it cost the farmer working it out time and money to secure it.

It retains its worth, but is free to the person who reads it in our pages. Some experience is a lesson to success, and others may point a way to avoid failure.

Where one has used a certain plant food as a fertilizer where the soil has not been analyzed, and if the results from using this fertilizer makes a good return and showing it will be safe to continue its use while the results are satisfactory. The scientific and proper method is to have the soil analyzed to know just what elements of plant food it contains and what it needs to put it in condition to produce standard maximum crops.

It pays also to stock up with good experience from every reliable quarter.

DON'T WASTE YOUR READING

The person who reads an article without giving much thought to it, in other words, reads much and thinks but little, or none, is wasting time.

It is necessary to obtain the value of your reading to run what is read through one's thinking machine, and thus put the matter in form to assimilate and make the knowledge one's own.

This is where the thinking and reasoning reader profits by the experience of the successful farmer's proven system, as he acquires this knowledge for his own, free of the cost of the experimenter.

The farmer cannot succeed unless he is capable to attain such; he must be one who thinks and acts on sound reasoning. He must depend upon himself more and thus develop himself on this line. Before he is aware of it he will have light where it was previously dark, and he will be working intelligently and with a satisfaction that he will richly appreciate.

The value of self-dependence is almost beyond computation to reach success. This character of person is aware of the fact and knows enough to know that the world is full of things he ought to know, and is a seeker after truths in his line; giving his best thoughts in considering them, enables him to make them his own. Then he has a basis from which he can reason, leading to the discovery of other valuable truths and facts unknown before.

The person who builds a success uses as his tools thought and reason.

WEAK BUSINESS POINTS

The farmers have had to contend with two serious business troubles to overcome, the one on disposing of their produce causes them the greatest aggravation, as they feel it more acutely.

The fact that the buyer usually fixes the price on the farmer's commodity and there are too many changes of handlers before reaching the consumer. These parties' profits through whose hands it passes is deducted from the farmer's price.

The plan of marketing the crops produced for past years has been one without organization and hence individually could not be orderly managed in the past.

It is believed that the American Farm Bureau Federation will improve, if not entirely remedy, these troublesome conditions. It is the strongest and the soundest body of organized intelligent business farmers ever formed for their relief and protection.

This bureau, proceeding under a head representing the body of farmers, will be able to act so as to bring about an orderly market.

They will thwart and prevent the rushing and crowding of the market, which frustrates an orderly market and presses down the price.

Through the co-operative marketing they are securing much relief in selling their live stock and fruit and other products; and saving commissions , and rendering dividends to the farmers made by the operation.

They are also by wholesale buying of fertilizers through their County Agents making a pronounced saving.

They are gradually perfecting their methods and plans to overcome obstacles and smooth out inconsistencies to meet the best results.

The director of the live stock marketing department of the Illinois farm bureau, estimates that 20,000 carloads of live stock, valued at twenty-five million dollars, were shipped to terminal markets through these associations in 1923, as 92 Illinois counties are served by one or more of these local associations.

Since the deflation of prices the adjustment has been on a scale on farmers' products that were unjust to the farmer and not in comparison with the goods he needed to buy.

The present farm bureau will enable them to much better protect the farmer's interests. The fact that the farmers are the upholders and sustainers of agriculture, the foundation of all other industries, and justly deserve to prosper.

HOW TO BECOME FAMOUS

A. B. Brown, an 1880 pioneer of Alexandria, S. D., writes us: "I like your motto, 'Make two blades grow where one now grows.' If you can now tell us how to get two cents for our farm produce, where we now get only one, your little farm paper would be famous, in giving the farmers double relief."

DIVERSIFYING INSURANCE

The farmer who wisely diversifies in his farming by producing corn, oats and wheat as the main grain crops, rotated, followed by clover or alfalfa or some one of the legumes. With pasture and hay crop in some legumes. A blue grass pasture is early and late feed. Live stock dairy, swine as economizers in feed and always a cash product, with a flock o sheep according to the size of th farm. Also poultry not only fo the profit they would bring bu for the farmer's own enjoymen and food.

This would make the framework for a farmer desiring to engage in diversified farming t build to or change to suit.

RED CLOVER THE WONDER CROP

Practices That Have Secured a Stand on Land Where It Had Been Thought Unprofitable to Sow

In order to accomplish his designs the farmer must use elements largely beyond his control; but, by combining these in the proper sequence with the forces within his power, with a love for the land, and a strong will, he may rise above failures and accomplish the things in which his weaker brother fails. It is useless to argue the virtues of red clover and its place in any system of permanent agriculture.

Two thousand years ago, the poet, Virgil, wrote of "clover and like plants" and their uses. But much has been said of late about insuring a stand, some have turned to other crops. While extolling its virtues farmers have said to me, "But your land will grow red clover." They forgot there was a time when my success was poor and my clover a thin stand. But I have sown it every year and every crop is better than the last. Now it is my surest crop.

In order to grow any crop there must be water, heat, soil fertility, and Seed. First, there is such a thing as super seed. Seed that will produce a plant of strong vitality, disease resistant, immune to the late cold snap, that will send its roots deep down beneath the dry soil against the day of drouth, a plant with inherited tendencies to grow tall with more leaves to provide breathing surface and gather nitrogen from the air. These super seeds make super plants that produce super crops. It is my practice to use seed locally grown. Beware of imported seed, some may be all right.

Having secured the best seed next comes the soil where they are to be sown, its fertility and preparation. Some lands are too poor to grow red clover. But a careful preparation may make your seeding stick where a careless seeding due o a lack of fertility would fail. Where it is necessary to plow he land be sure the seed bed is well firmed. If this is not done he natural settling or nature's rocess of firming the soil will reak the tiny roots and retard the rowth. Then on a well-firmed eed bed having a loose mulch on op sow the seed and cover them p, perhaps an inch, a little more n light soils. If sown on wheat or ye harrow them in and you will ot hurt the grain. It is my practice to disk in spring oats and then ow clover and harrow in. Many imes where seeded alone and on oor soils an application of acid phosphate 200 to 500 pounds per cre will give wonderful results. Barnyard manure, even a light application, has for me secured a tand. I never buy commercial fertilizers. Mine is a limestone country, with soil rich in lime. I make all the manure I can, use plenty of bedding and apply to clover land about the time of seeding.

Preparation of the soil will conserve the moisture if there happens a drouth. I have experimented along this line and find a seed bed pays. Seed can be sown when the ground is honeycombed with frost, not frozen smooth, but honeycombed so that the seed will work in with the thaw, and this can be done some time earlier than if harrowing is done. Much seed was lost in my country last spring by being sown when the ground was frozen; the seed sprouted and, while trying to grow, a blizzard came and the tender plants were killed. The time of sowing must be determined locally.

Where clover is clipped, it is advisable to do so early in the season and clip as high as possible. A rule I did not make myself but have found safe is to allow the young clover to go into the winter with enough growth to hide a rabbit. Do not graze or clip close late in the season. The main thing in securing a stand is to sow the seed and cover them up.

R. H. McCOWN.

THE 10-CENT BREAD LOAF

To compare a ten-cent loaf of bread with the wheat from which it was made should sell for $2.00 a bushel at least. This point shows that our consumers are making no complaint against the bread price or farmers could of held the price of wheat at $1.50 if the Canadian wheat could have been kept from competing with our home product. Samuel R. Guard, formerly of the American Farm Bureau Federation but now Director of Sears-Roebuck Agricultural Foundation, explains that a barrel of flour that weighs 196 pounds is obtained from four and a half bushels of wheat, and will make 280 loaves of bread. He says $1.00 a bushel means $4.50 for the wheat in a barrel of flour, or 280 loaves. On that basis, he contended the wheat in a loaf nets the farmer 1.6 cents.

LIKES IT VERY MUCH

Geo. L. Peters, Port Matilda, Pa., wrtes: "I like your paper very much and am enclosing subscriptions for BAYNES' SOIL IMPROVER for two of my frends as Christmas presents.

I consider every issue of this magazine worth a whole year's subscription. I do not wish to miss a single copy. I want to thank you for starting such a good paper and furnishing it to us at so small a cost. I do not want to miss a paper.

TIMES ARE ON UP-GRADE

Secretary Wallace of Department of Agriculture Is Pleased

There is a very assuring note of optimism in the New Year's greeting recently issued to all workers in the United States Department of Agriculture by Secretary Henry C. Wallace. Two facts stand out in this greeting; the Secretary is pleased by the spirit of unselfish service shown by workers in the experiment stations, agricultural colleges, in extension work, in vocational agriculture teaching, and in all lines of public service maintained for the advancement of agriculture, and he is convinced that times on the farm are better than a year ago and growing steadily better. He says in part: "I have seen our workers in the field of scientific agriculture at their work—in the offices, the laboratories, the fields, the forests. Everywhere I find them well thought of in the communities in which they live and respected by those with whom they have to deal.

"The Department is doing better work now than a year ago. We are working harder and more efficiently. There is better teamwork. We have made gains all along the line. Certainly we can enter the new year with right good will. Conditions with the people of the great open country, the people we serve, are much better than a year ago. We are on the up-grade. Just as the primitive people of early times celebrated this season of the year because it marked the return of the sun with its promise of another harvest, so can we celebrate this year as marking definitely an improvement in material conditions which warrants the hope of better times."

MANURE AND SOIL IMPROVEMENT

Maintaining the Plant Food Balance in Livestock Farming

According to an Iowa soils specialist, a 1,000 pound steer contains the phosphorus equivalent of a 125 pound sack of acid phosphate. A thousand pounds of live pork contains only slightly less than this amount. In the milk of the average dairy cow, the equivalent of 70 pounds of acid phosphate is lost annually when the milk is sold from the farm. These figures, when multiplied by the number of animals kept, assume great significance, and indicate that even in livestock and dairy farming the fertility of the soil is being depleted.

It has been estimated that a three-year rotation of corn, oats, and clover, yielding 50 bushels of corn, 60 bushels of oats, and 1½ tons of hay, where all the crops are fed and the manure recovered as far as practicable, the loss of phosphorus from a 120-acre farm is equivalent to 3,000 pounds of acid phosphate per year. This is, of course, a comparatively small amount as compared with the phosphorus supply of the soil, and on a rich soil it would take considerable time before any evidence of soil exhaustion would appear. These figures, however, assume a greater production and conservation of manure than is practiced on the average farm. The Ohio Station has determined that when all crops are fed the amount of manure produced averages 3.34 tons per acre annually. This would make a fair application every four years, but since, on the average, there is only one animal unit for each nine acres of farm land, comparatively few farms produce that much manure.

AVERAGE FARMER LOSES ABOUT $2.00 A TON ON MANURE

How Much of This Loss Can Be Prevented?

A. B. Carson

Many farmers do not yet realize the importance of preserving the nitrogen in barn yard manure. Because of wasteful methods in handling, the manure on the average farm loses anywhere from 40 to 50 per cent of its fertilizing value. This represents an actual money loss of about $2.00 a ton.

There are several reasons for this. Comparatively few barn floors are actually tight, and as a result the liquid portion escapes, carrying with it almost half of the plant food in the manure. Then, too, the manure is often piled on the ground just outside the barn and directly under the eaves. Here it is exposed for days, and even weeks, to the sun and the rain. In this way the valuable fertilizing elements are washed out, and rapid decomposition sets in, causing a great loss of nitrogen.

To prevent loss of plant food through leaching, manure should first of all be stored in a water-tight pit. This pit should have a roof to keep out the rain and to shield the contents from the sun. There are several different types of construction for manure pits. As a rule, the walls are about three feet in length, while the floor is often built on a level with the ground, it may also be built below the ground, so that the top of the wall is about six inches above the earth. For utmost efficiency a cistern should be constructed in connection with the pit. The floor of the pit should slope so that the liquid manure will drain into the cistern.

As a final method of preventing manure wastes, modern farmers are beginning to rely more and more upon agricultural gypsum. The general practice is to sprinkle the gypsum at regular intervals over both the liquid and the solid manure. The gypsum acts as an absorbent, and its consistent use in a finely ground form is said practically to eliminate the loss of nitrogen in the manure altogether.

SEED TO GET GOOD SOD

By Prof. J. F. Cox

A subscriber owning a farm in Allegan County, Michigan, asks what would be the best seed to get a good sod. It is a light sand acid soil. He can't afford to put lime on it now. This question is answered by J. F. Cox, professor of farm crops, Michigan Agricultural College, East Lansing, Mich., as follows:

"Orchard grass gives best results on light sands of a slightly acid nature in southwestern Michigan. It is a bunch grass and forms an irregular sod, but by mixing with red top a smoother sod results. I would suggest the following mixture:

15 lbs. of orchard grass.
3 lbs. of red top per acre.

"The above mixture should be planted on a firm seed bed in early spring or fall.

"In building up light soils of the nature described, it is cheaper in the long run to purchase lime, using two tons of ground limestone or several cubic yards of marl per acre, and planting to sweet clover or alfalfa. No grass is really well adapted for sod purposes on light acid soils. It is best to increase the content of organic matter and fertility of these soils by growing sweet clover, alfalfa or other legumes, so that they will carry good grass sods."

SOIL AND CROPS

Soybeans

Soil and crops are closely associated and every farmer is equally interested in them. There is a great importance attached to Soybeans by the Experiment Stations as well as the farmers who have them as a profitable crop.

In Henry & Morrison's "Feeds and Feeding," the standard work with scientists, Tankage is given:

Crude protein, 56.2; fat, 7.2; total, 71.4

Soybeans:

Protein, 33.2; carbohydrate, 24.7; fat, 16.1; total, 94.1.

The Purdue University states that Soybeans equal Tankage feed for hogs when a mineral mi ture was used; in the ratio equally as good results were s cured.

The mixture used consisted 10 parts 16 per cent acid phos phate, 10 parts wood ashes (ground limestone) and 1 part com mon salt. Mr. Vestal of Purdu says that with Tankage at $60 pe ton Soybeans were found wort $1.12 a bushel without mineral and $1.50 a bushel with the min eral mixture in the ration.

The acreage has about double each year for the past two year in Ohio. On land that will pro duce 50 to 60 bushels of corn yield of from 18 to 25 bushel of Soybeans may be expected pe acre and 30 bushels are not un common. At the factories the pay from $1.25 to $1.50 a bushel Most farmers feel they are wort more for feed. In Ohio th acreage of Soybeans grown fo seed is much less than that grow for forage. This information i from Crop Talk, Ohio State University, by Wallace E. Hanger.

SELL CO-OPERATIVELY

Nearly 8,000 Ohio live stock producers marketed their live stock during October co-operatively, according to figures compiled by the marketing department of the Ohio Farm Bureau Federation. Live Stock sent to market through the 47 counties included in the report netted at market $1,280,603.78.

PRINCIPLES OF SOIL FERTILITY

Probably no agricultural fact is more generally known by farmers and landowners than that soils differ in productive power. Even though plowed alike and at the same time, prepared the same way, planted the same day with the same kind of seed, and cultivated alike, watered by the same rains and warmed by the same sun, nevertheless the best acre may produce twice as large a crop as the poorest acre on the same farm, if not, indeed, in the same field; and the fact should be repeated and emphasized that with the normal rainfall of Illinois the productive power of the land depends primarily upon the stock of plant food contained in the soil and upon the rate at which it is berated, just as the success of e merchant depends primarily pon his stock of goods and the pidity of sales. In both cases e stock of any commodity must e increased or renewed whenver the supply of such commody becomes so depleted as to mit the success of the business, hether on the farm or in the ore.—Soil Report No. 25, Agr. xpt. Station, Univ. Ill.

EFFECT OF TILLAGE

Tillage, or cultivation, also astens the liberation of plant ood by permitting the air to enr the soil. It should be rememered, however, that tillage is holly destructive, in that it dds nothing whatever to the oil, but always leaves it poorer, far as plant food is concerned. illage should be practiced so far s is necessary to prepare a suitble seed bed for root developent, and also for the purpose killing weeds, but more than is is unnecessary and unprofitble; and it is much better actuly to enrich the soil by proper pplications of limestone, organic atter and other fertilizing marials, and thus promote soil nditions favorable for vigorous lant growth, than to depend pon excessive cultivation to acmplish the same object at the pense of the soil.—Soil Report o. 25, Agr. Expt. Sta., Univ. l.

A FARMER'S EXPERIENCE

Fifty years ago I saw manure id but little good until it rotted, hile the fence posts rotted off the top of the ground.

I began spreading manure on p of the ground. An old Pennlvania farmer was my nearest eighbor. He would walk over my fields and one day said: "I'll admit you get a bigger crop than I do, but I am after making the soil." "If I get a bigger crop don't I have more to put back?" was my answer.

With regard to phosphorus, I have never had to buy any. In my boyhood days we found fox fire in the woods on top of the ground. I concluded that decay of vegetable matter on top of the ground must make a supply of phosphorus.

A few years ago I bought ten acres of worn-out land. I sowed it in orchard grass and clover. Every stalk of clover perished as it came up and the orchard grass lived.

I wrote the agricultural college at Columbia, Mo., to know the cause. Mr. M. F. Miller replied the vegetable matter in the soil was exhausted. I spread manure on the field and since have had no trouble in getting clover to grow on it.

I have raised no timothy for 40 years, preferring orchard grass, as it is the last of the fall pasture and the first in the spring to make pasture, and makes good hay and comes in with clover as to ripening.

J. L. ERWIN, Fulton, Mo.

THE PREPARED SEED BED FOR SUCCESSFUL CROP

By W. D. McKee of Missouri

From Missouri State Board Agr. Bulletin Aug. 1923

The Greatest Teacher of all mankind in his Agricutlural parable, "Behold a sower went forth to sow." The seed that fell in good ground, a good seed bed, brought forth some thirty, some sixty and some a hundredfold.

Thus it was in the days of Joel, and when Jesus dwelt among men —and thus will it ever be. Keep the clods out of the seed bed.

In answer to the question, "What do you call a good seed bed?"

The very first, as well as logical step, to be taken in the preparation of an ideal seed bed is to thoroughly pulverize the surface, before plowing, with a sharp disk well weighted down.

This should be done, and well done, for many good and sufficient reasons. If the land to be plowed be sod land, the disking will cut the sod into narrow slices or strips, reducing the draft when you come to plow. Also you will cut fine any growth that might be on the surface, insuring a more even and a better turned furrow slice, with a more uniform distribution of any surface trash on the bottom of the furrow.

Disking will also aid in turning weed seeds and eggs and larvae of insects into the bottom of furrow where they will sleep that sleep that knows no waking.

If the land be cornstalk land or stubble land, the surface trash, stalks, stubble or straw, can be ground into powder with the disk, incorporating or mixing this vegetable matter with the entire furrow slice, avoiding air pockets or cushions between the furrow slice, preventing moisture from getting down into the sub-soil or from coming up from the sub-soil in the furrow slice. After this has been done, and the plowed land has been harrowed up to the plow to prevent the escaping of any moisture, then go on this freshly spring plowed land with the disk and make an onion bed of the surface—and you will have a seed bed from skin to core and from core back to skin again—one that you can take a hoe or a spade and make as many cross sections as you like without any fear of your test revealing air

(Continued on page 11)

"DO UNTO OTHERS AS YOU WOULD BE DONE BY"

If you have found this paper instructive and interesting

TELL YOUR NEIGHBOR ABOUT IT

and tell him that it can be had 12 months for 25c or 5 years for $1.00, with the valuable booklet "Feeding Dairy Cows," by the author of "Feeds and Feeding," as a premium.

COUNTY AGRICULTURAL ADVISERS' DEPARTMENT

For exchanges on ideas on operating office, and relating successes and matters of interest for discussion

It's free to you. Use it freely for your interests

SUCCESS FEEDING SOIL

The person who makes a success as a feeder of live stock wins a reputation that has a high value.

It enables him to secure employment as a feeder of live stock at any time. As his ability to make a profit for the live stock owner, causes his services to be in demand.

The successful feeder of the soil has equal or greater money making power for the land holders' benefit. It is a higher work and requires careful study with the training to obtain a thorough knowledge of this scientific soil feeding.

It is one of the needed equipments of a County Agent; the greater his achievements as a successful soil feeder, the higher his standing, and the greater his salary and the stronger the demand for his services.

The County Agent who is ambitious and energetic and uses forcefully his good clear common sense applied with reason will make some startling success that will make a true winner.

The opportunities are unlimited and ripe for harvest.

County Agent W. E. Hart, Louisville, Illinois, says in *American Farming:* Chinch bugs will not feed on soybeans, cowpeas, clover, fodder beets, buckwheat, sunflowers and rape. Chinch bugs thrive on nearly all kinds of grass, grain crops such as corn, wheat, oats and timothy, red top, etc. It is decidedly profitable to plant soybeans in every acre of corn, regardless whether any direct use is made of the soybeans.

BIG TOBACCO CROP

County Agent Walter Rogers, Bloomington, Indiana, says in *American Farming:* Farmers in southern part of this county have had remarkable success growing tobacco. These farmers most come from Kentucky and know the tobacco game. They pronounce this year's crop matchless in Kentucky. They have no difficulty in realizing from $400 to $500 per acre for their tobacco grown on rolling farm land. Some are planning to plant from 12 to 15 acres next season.

MICHIGAN BUREAU SAVES FARMERS HALF MILLION

The Michigan State Farm Bureau in winning its two-year fight against unjustly high freight rates imposed upon Michigan shippers by a "zoning system" has saved the farmers of that state one-half million dollars annually. The saving for all the shippers of the state amounts to $1,500,000 annually.

The Michigan State Farm Bureau started its fight against the Michigan "zoning system" two years ago. The Interstate Commerce Commission in its decision December 21, 1923, abolishing one one zone and modifying rates in the other two, ruling to become effective about March 21, 1924.

The Michigan zone rate case came to a head in April and May, 1922, in a hearing before the Public Utilities Commission and the Interstate Commerce Commission.. The Michigan State Farm Bureau and the Michigan Traffic League appeared for farming and manufacturing interests against some thirty-nine defendant railroads.

The case went from Lansing to Washington, and E. L. Ewing, Farm Bureau and Traffic League counsel, appeared before the Interstate Commerce Commission in February, 1923.

The Interstate Commerce Commission's decision abolished Zone B by merging it with Zone A, which has the same rates an Indiana, Ohio, etc. Rates in Zones C and D were reduced.

COMPARISON

Man is an inferior animal, science tells you. If you were as strong as an ant you could lift 120 tons. If as agile as a flea, you could jump over a tall building. What of it?

By pressing a button, working a machine created by his brain, man can lift many thousand ton
He can't jump like a flea, but h
can go up in a flying machin
and stay up. The flea cannot d
that. It's better to have th
power in your head than in leg
or arms.—Brisbane Capper
Weekly.

A BRAVE SCHOLAR

The stalwart, leading, progressiv
breeder of Berkshire swine i
America is located at Sedalia, Mo
where he has established a herd o
the pioneer breed of pure breds
the excellence of which is know
to breeders in the United State
Canada, Great Britain, Mexico an
South America.

This master breeder is N. H
Gentry, who has devoted a lifetim
of successful study to the breed
ing problems of live stock, Berk
shire swine and Short Horn cattl
and recognizes the great impor
tance of improving and maintainin
the fertility of the soil.

Mr. Gentry is as enthusiasti
over the question of caring for th
Soil, the heart and life blood o
the farm, as an ambitious schoo
boy. In a communication fron
him to the "Soil Improver," h
says, "I am going to school t
Baynes' Soil Improver, and I wan
to tell you how greatly I enjoy an
am benefited by it."

This acknowledgment of M
Gentry shows the pressing need fo
a magazine on the line of the im
provement of the SOIL, as it i
generally admitted by all farmer
that the general farmers are bet
ter posted on all other farm prob
lems than on the Soil, which is th
most important.

KANSAS TURKEYS

F. W. Caldwell, a county agent
Garden City, Kansas, whose tur
keys were in surplus, asked fo
plans to dispose of them.

The desired information wa
immediately furnished to th
Kansas county by the Transpor
tation Department of the Amer
ican Farm Bureau Federation.

The county is shipping abou
fifteen thousand pounds o
dressed turkeys to Chicago an
while they are a little late to ge
top prices, they are assured price
considerably over local prices
providing they carefully grad
their stock and ship carefully.

(Continued from page 9)

ckets, bumpers or cushions, or a ie surface resting upon a founda- on of clods.

If you plow in the fall, you don't ant to finish the seed bed as with ring plowing. One of the reasons r fall plowing is to turn down in- ct eggs and bury weed seeds— it one of the principal reasons is provide a reservoir to catch and ld the melting snows and early ring rains. This works to a good vantage on rolling land, provided e furrows are laid with the plan a mangum terrace so as to pre- nt washing. Now, if these fur- w slices are left uneven they will tch and hold, very much the me as a mulch, the winter snows d rains as they fall.

This precaution would be futile d time worse than wasted if the rmer should neglect to go on to ch fall plowing the first day that il conditions will permit and eak up, with the disk, the puddled ndition caused by the snow and ins to the surface of this fall owed land.

Don't get in a hurry when pre- ring this seed bed. You can arcely take too much time in lay- g this, the real foundation of the op, because it is in this seed bed at seed must be born to life. ere it must be nursed into rength enough to be pushed above e surface and stand alone.

The whole future of the plant, its gor to fight its battles against outh, insects and other enemies, e quality and the quantity of the op yield depend largely upon the art it gets in this well prepared ed bed.

Let the farmer who begrudges e time, or thinks highly of the portance of the foregoing state- ent, allow this fundamental truth sink deeply down into his heart, at there is as much advantage to gained in starting a young plant f right as in starting a young imal.

The same laws that underlie the owth of animals apply to plants. he stunted plant is just as surely ndicapped in the game of life as e stunted animal. The poor seed d in a poor season is a death- ow to the crops, inviting failure d disappointment.

No one will deny that a plant in good seed bed, which is rich in ant food and moisture, will be ronger and more vigorous, will rive better, grow faster and ripen rlier than a weak, spindling, frail ant in a poor seed bed—it has a better chance to pull through a drouth, and it will take more withering, blasting dry weather and sap-sucking insects to kill it.

Going back to my definition of an ideal seed bed, I said that it must contain sufficient moisture to grow the crop. I have been plowing corn, sowing oats and taking part in growing crops for fifty years—and I think I know that moisture is more often the controlling or limiting factor in crop production than any other one agency.

You may have good soil, plenty of fertilizer, all needed implements and help, but if you haven't enough moisture your crop will be cut short. For that reason, it is a conservative statement when I say that there is one common fear to all farmers—the fear and dread of a withering, blighting, destructive drouth. For that reason, the seed bed should be built and constructed above everything else, so as to withstand the crushing effects of this grim destroyer, that comes as a thief in the night.

As proof positive of my contention, permit me to offer one concrete example that fell under my own personal observation. In 1914, I went from county to county in one of the best corn growing sections of this country to judge the corn exhibits at the farm products shows. The corn exhibits that year were made up of a very low quality of chaffy corn low in feeding value.

I went over the same territory the next year on the same errand, and I found the exhibits, by the same exhibitors, to be of high quality, sound merchantable corn rich in feeding value. It was produced on the same farms, by the same teams, same kind of seed, same tools, same men. It was not the result of more intelligence or industry. In 1914, they had a drouth—in 1915 there was plenty of rain at the right time.

There is nothing the farmer can do to make it rain when he needs it, but there is something that he can do with his seed bed to make it soak up and hold the rain, when it does fall, so it will last through the growing season and be there when the plants need it most. Don't lose sight of the stubborn fact that the farmer cant just run out a few teams or a tractor and make a good seed bed.

Someone asked Oliver Wendell Holmes, that great Medical Doctor, Diplomat and Statesman, when should the training of a child begin.

Agricultural Gypsum

A Proven Food for Alfalfa Clover and Other Crops

Tests made in recent years by Agricultural Stations in various parts of the country have shown conclusively:

1. That alfalfa, clover, cow peas, soy beans, vetch, cabbage, turnips, rape, onions, potatoes, tobacco, etc., use much sulphate sulphur.

2. That sulphate sulphur is supplied most economically by AGRICULTURAL GYPSUM.

3. That by increasing legume growth AGRICULTURAL GYPSUM increases the nitrogen in the soil and assures increased future crop yields.

4. That AGRICULTURAL GYPSUM preserves barnyard and hen manure and adds greatly to its value by fixing the ammonia which is rich in nitrogen.

Insure profitable returns from your high priced clover seed, alfalfa seed, etc., by applying this

Economical Plant Food

Your local building supply dealer can furnish you with Agricultural Gypsum. Give it a trial this spring on a test strip.

Send a postcard to-day and we will forward you free our new book "*The How and Why of Agricultural Gypsum.*" Write quickly.

THE GYPSUM INDUSTRIES
Dept. 112—844 Rush Street
Chicago, Illinois

Ratstik

holds 'em

Ratstik Catches Rats Like Sticky Fly Paper Catches Flies

Science has produced RATSTIK, the quickest, surest, non-poisonous product for catching and quickly killing rats—mice. Just spread RATSTIK on loose boards. The food odor draws rats and mice unfailingly to RATSTIK, which holds them fast—a sure, quick death.

Quick—Sure—Safe—Not a Virus

Harmless to children, pets, stock. Nothing poisonous. But when a rat puts one foot on RATSTIK he is lost. Works perfectly, regardless of weather conditions. R. Conway caught 22 rats in one night. Results guaranteed.

Get $1.00 Can FREE

To advertise this wonderful product and secure quick, national distribution, we give you an extra can absolutely FREE with every order for RATSTIK. Sell this full-size can to your neighbor and get yours free.

SEND NO MONEY

Simply send name and address. Pay postman $1.00 plus few cents postage. Act now! A post card will bring you this special offer by return mail.

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305 Manhattan Building Chicago, Illinois

EDGEWOOD
13 Acre Turkey and Poultry Ranch

FOR SALE: Nice young thrifty Narragansett toms from prize winning stock, $10 and up. Also three and four year old hens at $7 each.

My strain of purebred turkeys have been bred for 19 years for size, vigor and egg production.

Have shipped into 22 states with statisfaction that brings re-orders. Satisfaction guaranteed.

Mrs. S. H. Brooks, Salem, Indiana

"One hundred years before its birth," was his sound reply—and so it is precisely true (in several ways) of the preparation of the seed bed.

The preparation of the soil for the best seed bed should begin away back years ago with a sane, sensible, sound crop rotation, with the keeping of livestock, the intelligent conservation of every ounce of barnyard manure, the growing of leguminous crops to increase the vegetable content of the soil, that it may possess that double power of both receiving and retaining the moisture that comes to it through melting snows and from the rains from the clouds. Every particle of manure, stubble and straw should be returned to the soil.

According to figures gathered by the United States Department of Agriculture, Washington, D. C., the American farmers burn each year $65,000,000.00 worth of straw. Then add to this the million dollars of cornstalks burned (aside and independent of campaigns for the destruction of chinch bugs, which is all right) the figures become stupendous, staggering and appalling.

I have seen, and you have seen, from 3 to 5 strawstacks on the same farm (representing different threshing seasons) left to rot down just as they fell from the stacker or blower; these strawstacks left as eye sores to provide a veritable nuisance out in the field to go around with the plow, the disk, the harrow, the planter, the cultivator or the binder, to furnish an incubator for the hatching of insect pests and homes for "varmints" when the soil all around is crying, yea, agonizing for the plant food and vegetable matter worse than wasted.

Did you ever stop to think the lessons to be learned of the efficiency and power of vegetable matter on the texture, tilth and physical condition of the soil? It works like magic, and this lesson can be gained on your own farm.

In addition to adding to the quality and power of your seed bed as a soil moisture reservoir, vegetable matter in a measure nullifies the effects of too much or too little moisture in the soil when you come to make the seed bed. When plowing across the field and the land is breaking cloddy, and you come to where the strawstack has been scattered, your mouldboard turns a nice, mellow furrow-slice. Again, when your furrow slices were turning over slick and shining, you found them at that same spot changing to one of the proper granulation and ideal for the raw material out of which to build that seed bed, the apple of the farmer's eye.

Plants differ from animals. It is true at birth they are both helpless, but, in time, animals grow more independent in that they acquire the power and judgment to roam about in search of food and drink. Not so with plants—they are staked down to their Lord of Creation and must live and die there.

The farmer doubtless expected just as much of the clover seed that sprouted and produced a plant that succumbed to the dry weather as he did of the one that grew and overcame all obstacles. So far as the seeds were concerned, one could not be blamed and the other deserved no praise. The responsibility rests with the farmer. Then I ask the question: "Is the making of the seed bed a task that involves no more than turning furrow slices and mashing clods, or does it carry with it a moral obligation or a human responsibility?"

Moral: Scatter these mammoth strawstacks behind the stock for bedding, and then at the right time haul the manure out on the field and, as one who demands a square deal for yourself, give all the seeds an equal chance.

I want plenty of humus in my seed bed for other reasons than that it will increase its efficiency as a soil reservoir. Again, when you were bewailing your fate and bemoaning the fact that you had lost your clover seed on that forty sown with oats, to your surprise and also with some chagrin, you discover you had a good stand of clover on that spot where you spread the old strawstack.

"Why do clover plants grow thick all around this spot in the field and none elsewhere?" The vegetable matter catching and holding the moisture, together with the added plant food, caused these young clover plants to grow and thrive, to develop a root system—delving down into the sub-soil below the danger line caused by the drouth and enabled them to come up smiling after their less fortunate sojourners had languished and died. Vegetable matter greatly hastens the maturity of the plants.

How often have you been plowing corn when the cultivator arch went sweeping over the cor scarcely bending the tops, muc less breaking it off. But how di tressingly different when you cam into the immediate neighborhood the old strawstack that had bee scattered, rotted down or trodde down by the live stock. On a count of the vegetable matter the soil at this spot, the corn wa tall, vigorous, luxuriant and full sap and dark rich green color. A the arch of the cultivator passe over, you could hear these big te der stalks crack and pop, whic made your entire frame quake wi sore regrets. You were sorr twice to know that you were d stroying the best corn in your fiel and also sorry that the whole fiel had not been managed in such way that all the corn was not s big and fine.

What a wonderful exhibitio what a striking, soul-stirring lesso and example of what that indi pensable magic working ingredien vegetable matter will do by increa ing the seed bed's power for goo Is it any wonder that you got good stand of clover here, whe failure and despair was to be see in all other parts of the fields?

No more rainfall! The dew were no greater here! The sun rays were just as blighting an destructive here, but the plan smiled, waxed fat and pulle through. Plenty of this life-givin humus will hasten maturity, a not only seen by the stronger stalk for your observation has taught yo that these self-same stalks cam into silk and tassel, and then int the roasting ear stage earlier, an into the ripened grain much earlie —thus ofttimes aiding such a patc to escape the drouth, and just a often missing a withering, blastin frost.

VALUABLE INSTRUCTIO ON LEGUME INOCULATION

Probably there is no farmer today who does not recognize th value of legumes for feed and so improvement, and who does no know that these legumes in tur depend on certain bacteria fo their ability to take nitroge from the air and build it up int food for man, beast and so However, the rapidly increasin acreage of new legumes for whic inoculation is necessary gives ris to many questions about the de tails of the process, which th "talk" attempts to answer briefly.

Inoculation and Its Results.—Inoculation of legumes is supplying the legume in some way with the necessary nitrogen-fixing bacteria. Most farmers are acquainted with the nodules or growths on the roots of legumes which are the result of infection with these bacteria, and the visible evidence of successful inoculation. These nodules are of various shapes and sizes, but each legume produces a characteristic nodule. In some cases, notably alfalfa, nodules are hard to find unless the plant is dug carefully because they pull off easily and are left in the soil if the plant is pulled up. They may be at all depths in the soil, but are most abundant on the surface roots. The bacteria themselves are so small that it would take 10,000 to 25,000 of them end to end to measure an inch.

Legumes will grow even if these bacteria are not present but they will be as dependent on the nitrogen of the soil as are such crops as corn and timothy. On poor soils this will result in a poor growth of the uninoculated crop, and where all other conditions are favorable to the crop inoculation may double or treble the yield. On good soils the legume may grow as well without inoculation, but the soil is being depleted instead of enriched. The protein content of the uninoculated legume is usually lower than that of the inoculated even where the total yield is the same.

Are All Legumes Infected by the Same Bacteria?—It was at first supposed that every legume had its own specific bacteria. Later, cases were discovered in which different plants were infected by the same organism. Careful investigations show that the common legumes grown in Ohio are hosts to six distinct strains of bacteria, as follows:

Group 1. Red and mammoth clover, alsike clover, white clover, crimson clover.

Group 2. Alfalfa, all sweet clovers, yellow trefoil.

Group 3. Cowpeas, Japan clover, peanuts and several wild legumes.

Group 4. Garden and field peas, all vetches, sweet peas.

Group 5. Soybeans.

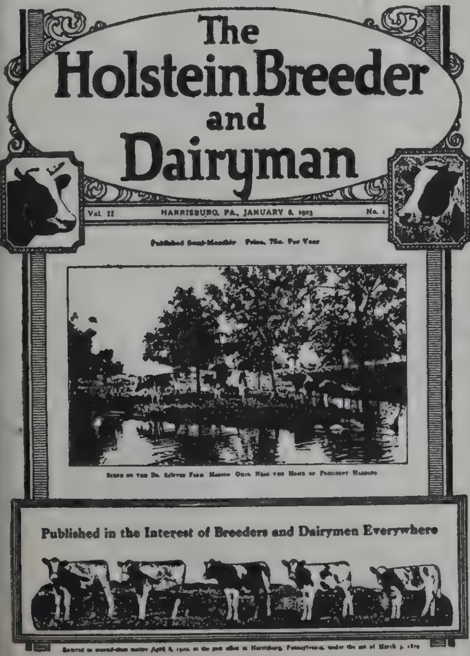
Group 6. Garden and field beans.

This means that bacteria cultures or soil from one member of a group will inoculate any other member of the same group, but not the members of any other group. Soil or cultures from alfalfa, for example, may be used to inoculate sweet clover, but they will be of no value for vetch or cowpeas, while no other crop has the same bacteria as soybeans.

When Is Inoculation Necessary?—Inoculation is always necessary for the profitable growing of any legumes, if the bacteria are not already present in the soil. Unless the field has recently produced a well-inoculated crop of the legume to be sown or of some legume in the same group, inoculation is probably necessary. The presence of nodules and a green, healthy, vigorous growth are the best evidences of inoculation. **When in doubt, inoculate.** The process is simple, and often means the difference between success and failure. However, inoculation is of no value for any crops except legumes. Corn, wheat, potatoes, timothy and similar crops are not infected by these bacteria.

Is Natural Inoculation Possible?—Natural inoculation is extremely common. One farmer said, "Why, this inoculation business is all bunk. I sowed alfalfa without any inoculation and it has done fine." Such cases happen constantly, and the reason is that the bacteria have been brought in in some other way. Some are usually carried on the seeds, and so there are practically always some inoculated plants in a field, whether artificially inoculated or not. Some farmers take advantage of this and prepare for seeding alfalfa alone by including a little alfalfa in their hay mixtures. This method is valuable in some cases, but is rather uncertain. Manure from feeding legume hay, if spread as made, often carries enough dirt and uneaten shatterings from the hay to inoculate the field on which it is spread. Washing from one field to another carries the bacteria. Wind

(Continued on page 15)



The Holstein Breeder and Dairyman

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Published in the Interest of Breeders and Dairymen Everywhere

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VALUE OF PHOSPHATES ON INDIANA SOILS

Agricultural Experiment Station, Purdue University

This experiment field is located on the Moses Fell Annex farm, about six miles northwest of Bedford. The soil is a yellowish brown silt loam, representative of the most of the uplands of Lawrence and neighboring counties. Although this soil is underlaid by limestone and is probably of limestone origin, the laboratory test showed it to be acid and the subsoil very acid. The field was thoroughly underdrained in the spring of 1915 and planted to soybeans. This crop made a fair growth and was plowed under in the fall, at which time the first wheat crop was sown and the limestone and various phosphate treatments were begun.

One object of this experiment is to study the relative merits of the principal phosphates as supplements to manure on land sufficiently limed to insure proper development of all the crops in the rotation. Another object is to determine the relative values of acid phosphate and rock phosphate used alone, with lime, with manure and with both lime and manure. A third object is to determine the effects of different quantities of acid phosphate and rock phosphate as supplements to manure on limed land.

The limed plots received four tons of ground limestone per acre in the fall of 1915. The manured plots receive six tons of manure for each corn crop. The rock phosphate is plowed under with the clover residues on the unmanured plots and with the manure on the manured plots for corn. The other phosphates are broadcasted and harrowed in before planting the corn. The crop rotation is corn, wheat, and clover, and all the produce is removed except the second growth clover.

In the test of different carriers of phosphorus, the caid phosphate (16 per cent), basic slag (18 per cent), and steamed bone meal (25 per cent) are applied at rates to supply 48 pounds of phosphoric acid per acre per rotation in each case. The rock phosphate (30 per cent) is applied at a rate to supply 192 pounds of phosphoric acid per acre per rotation, which places the comparison on the basis of approximately equal money values of the different phosphates.

In Table X are shown the results from acid phosphate and rock phosphate used alone, with lime and with manure, and the results from the four different phosphates with both lime and manure.

By referring to the first part of Table X, it will be seen that when used alone, both acid and rock phosphate have produced large crop increases. In this case the rock phosphate, largely through the increase of 1,255 pounds in the clover crop, has been more profitable than the acid phosphate netting $14.24 per acre per rotation as against $10.17 for the acid phosphate. The natural acidity in this soil apparently makes available to crops the larger amount of phosphorus contained in the rock phosphate. The soil is not so acid as to prevent the growth of clover. Under these conditions the ability of the clover crop to utilize the raw rock phosphate is particularly noteworthy.

Where the phosphates were used on limed land, as shown in the second part of Table X, the acid phosphate has been much more effective than the rock phosphate. The smaller returns shown for both of the phosphates on the limed section as compared with the unlimed section are in part due to the fact that the first two corn crops on the "lime alone" plot received manure, which doubtless also affected the first two wheat and hay crops. The point to be particularly observed in this case is the relative effects of the two phosphates in the presence of lime. Evidently the liming has materially lessened the availability of the rock phosphate.

Where the phosphates were used on limed land, as shown in the second part of Table X, the acid phosphate has produced a net return of $5.19, while the rock phosphate has been used at a net loss of $2.04 per acre per rotation. Apparently, the liming of this soil hinders the raw rock phosphate from becoming available, while it favors the utilization of the acid phosphate.

Where the phosphates were used on manured land, as shown in the third part of Table X, the acid phosphate has yielded a net return of $15.08 and the rock phosphate $15.25 per acre per rotation. Here, again, in the absence of lime, the rock phosphate has produced the larger returns. It is worthy of note, too, that both of the phosphates have been more effective on manured land than on unmanured land.

Where the phosphates were used on limed and manured land, as shown in the fourth part of Table X, the acid phosphates have yielded a net return of $9.03; the rock phosphate, $3.75; the steamed bone, $7.29, and the basic slag, $7.30, per acre per rotation. For each dollar invested, the acid phosphate has yielded a net profit of $2.69; the rock phosphate, $0.98; the steamed bone, $2.17, and the basic slag, $2.17.

TABLE X—RESULTS FROM PHOSPHATES ON CORN, WHEAT AND CLOVER ROTATION—BEDFORD EXPERIMENT FIELD, 1916-1921

	Average yields per acre					Average total per acre per rotation		
Treatment per acre per rotation	Corn bushels	Stover pounds	Wheat bushels	Straw pounds	Hay pounds	Value of increase	Cost of treatment	Net returns
Nothing	26.6	1,710	3.0	330	1,057			
Acid phosphate, 300 pounds	40.1	2,027	6.2	661	1,691			
Rock phosphate, 640 pounds	40.6	2,132	6.5	737	2,312			
Increase for acid phosphate	13.5	317	3.2	331	634	$13.53	$3.36	$10.17
Increase for rock phosphate	14.0	422	3.5	407	1,255	18.08	3.84	14.24
Lime alone	30.7	1,767	5.6	670	1,467			
Lime, acid phos., 300 pounds	39.4	1,931	8.4	968	1,918			
Lime, rock phos., 640 pounds	32.1	1,803	6.2	696	1,758			
Increase for acid phosphate	7.0	103	2.6	288	419	$8.55	$3.36	$5.19
Increase for rock phosphate	0.3	25	0.4	16	259	1.80	3.84	2.04
Manure, alone	36.9	1,925	3.8	484	1,250			
Manure, acid phos., 300 lbs.	52.6	2,712	8.9	998	2,036			
Manure, rock phos., 640 lbs.	48.9	2,500	8.2	901	2,601			
Increase for acid phosphate	15.7	787	5.1	514	786	$18.44	$3.36	$15.08
Increase for rock phosphate	12.0	575	4.4	417	1,351	19.09	3.84	15.25

(Continued from page 13)

often spreads the bacteria in dry climates. Wild plants of the same group may be present in the field. The little yellow trefoil which is found all over the state has probably inoculated many fields for alfalfa and sweet clover, and the plants in Group 3 scarcely ever require inoculation, so common are the wild plants in this group.

How Shall We Inoculate?—There are two general methods of inoculation; the use of artificial cultures produced in the laboratory on various media, and the use of soil from previously inoculated fields. Both methods give perfectly satisfactory results. The bacterial cultures, while at one time uncertain, are now as standard and safe as any other commercial agricultural product. They are for sale by nearly every seed firm, are easy to use, and not extremely expensive. Since the media on which they are grown vary, they should always be used according to the manufacturer's directions.

However, the soil methods have many advantages. They are at least as sure as the cultures, they are less expensive, and may be made equally convenient. They are particularly adapted for use after a man has one field of a legume growing on his farm and wishes to seed more. It is usually best to try a new legume on a small scale, and the smallest successful patch of a legume will furnish inoculating soil for every field on the farm.

Applying Soil to the Field.—The soil transfer method is the oldest and remains the surest method of inoculation. Top soil (usually to plow depth) from a field which has grown a well inoculated crop of the legume to be sown, or one in the same group, is collected and sown over the new field at the rate of from 400 to 500 pounds per acre and harrowed in. The soil may be spread with a manure spreader, or if dry, with a lime spreader. The soil may also be dried, sifted and sown through the fertilizer attachment of the drill when the seed is sown. In this case from 100 to 150 pounds will be sufficient and 100 per cent inoculation is assured. The objection is sometimes raised to this method that it is likely to spread weed seeds and diseases of plants which are carried in the soil, but this objection is of little importance under Ohio conditions. One can easily determine whether the field from which he is securing soil is infested with any weeds or diseases likely to injure his own field. The most serious objection is the expense and trouble of securing and sowing the soil, unless one has it on his own farm.

Applying Soil to the Seed.—There are several methods which apply a small amount of soil directly to the seed which have given good results in practice. In one of these, the "glue" method, the seeds are moistened with a dilute glue solution (6 oz. of ordinary carpenter's liquid glue in 1 gallon water. Then dry soil is sifted over the moist seeds and thoroughly mixed until all the seeds are smeared with the soil. The seed should be just moist, so that the soil nearly dries them. The seed is then spread out thin to dry and may be sown within a half hour, or it may be thoroughly dried and stored for weeks without injury. From one to two quarts of soil are needed for a bushel of seed. Sugar may be used instead of glue, and water alone has been equally successful. Another very similar method is to stir the soil into two or three times its bulk of water and sprinkle the seeds with this muddy water. All of these methods have been used successfully hundreds of times.

Service

*"I keep six honest, serving men;
(They taught me All I Knew):
Their names are WHAT and WHY and WHEN,
and HOW and WHERE and WHO"*
KIPLING

WHAT was the Declaration of London?
WHY does the date for Easter vary?
WHEN was the great pyramid of Cheops built?
HOW can you distinguish a malarial mosquito?
WHERE is Canberra? Zeebrugge?
WHO was the Millboy of the Slashes?

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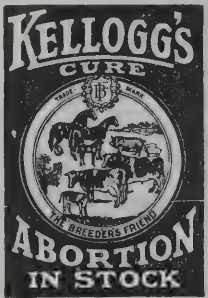

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Collecting Inoculating Soil.—The most important precaution when using only a small amount of soil is to be sure the soil is well inoculated. To do this it is best to secure soil from around the roots of plants of the desired kind that show by their abundant nodules that they are inoculated. It is well to dig the roots and nodules with the soil. Allow this soid to air-dry in any convenient place, then crush and screen it. Such material will always give satisfactory results, while bulk field soil may give only from 20 to 70 per cent inoculation. For spring seeding it is desirable to secure soil the fall before.

Various Points Concerning Inoculation.—It is commonly said that soil for inoculation must not be exposed to sunlight, but recent tests and much practical experience show that there is little if any danger from this source. While it is well to avoid needless exposure, one may in practice pay no attention to sunlight as a source of injury when using soil methods of inoculation. Air-drying of soil does not injure its value as inoculating material. Such air-dried soil may be kept at least 12 months and still be safe to use. Frost and freezing have no harmful effect on these bacteria in the soil.

Only rarely is the first crop on a field thoroughly inoculated by any method, and the better inoculation of the next crop undoubtedly has much to do with the frequently observed fact that the second seeding of alfalfa, vetch, or sweet clover on a piece of land is much better than the first.

How Long Will Legume Bacteria Live in the Soil?—No definite answer can be given to this question. It depends partly on the soil, some soils being more favorable to the organism than others. The Wisconsin Station reports a case in which soybean bacteria lived in the soil for 17 years, and there is no reason to believe this exceptional. Acid soils are injurious to the bacteria of those legumes which are themselves injured by acid soils, but the bacteria can withstand any degree of acidity which will permit a paying crop of the legume. Certainty on all ordinary soils that produce satisfactory crops of the legume to be grown, it is not necessary to reinoculate in an ordinary, 4-, 5- or 6-year rotation, once the field has been inoculated. —C. J. Willard, Department Farm Crops, Ohio State Agrl. University, December, 1923.

SOYBEANS WORTH $30 AN ACRE

At Market Price Yield $30 on 30-Bushel Corn Land

Soybeans have become definitely established in crop rotation systems in Missouri, according to reports that are coming in to the field crops department of the Missouri College of Agriculture from farmers of the state, who are working with the college in this phase of farming.

A recent report from R. C. Dodsworth, of Sullivan county, tells of his experience with soybeans this year on his farm near Greentop. Mr. Dodsworth drilled soybeans in a 5½ acre field of corn at the same time that he planted the corn. He mowed them this fall after the corn had been cut. His corn produced 45 bushels to the acre and the beans yielded 18 bushels, thus making a total production of 63 bushels to the acre. In addition Mr. Dodsworth had 10 acres of soybeans double-rowed, and 40 acres planted with corn which he used for hogging down.

Another report shows that Ernest Winston, of Knobnoster, raised 1,100 bushels of Midwest soybeans this year, averaging 21 bushels and six pounds to the acre on 30-bushels corn land.

These farmers find not only better conditions in their soil after growing soybeans, but also a decided increase of profits over some of the more widely known crops. The market price of beans for oil is now around $1.50 per bushel, and for seed up to $4.00 per bushel.—Mo. Col. Aga., Columbia.

WHY PURE BRED LIVESTOCK

Why farmers turn from scrub livestock to purebred livestock is a question that is full of interest and of practical value. Mr. D. S. Burch, of the Bureau of Animal Industry of the United States Department of Agriculture, has made an investigation on 525 farms owning 25,000 head of breeding livestock and about 30,000 fowl.

On the farms investigated the percentages of reasons why these farmers change from scrubs to purebreds ran as follows:

From reading, 36%; from observation, 17.5%; from influence of county agent, 12.9%; from meetings, Farmers' Institutes etc., 10.1%; from sales, fairs and shows, 6%; from home influence 4.3%; from college instruction 4.1%; from natural liking, 3.6%; from livestock club work, 2.4%; for miscellaneous reasons, 2.6%.

Back in 1921, County Agent A. A. Pryor in Fayette county, Tennessee, one of the big West Tennessee cotton counties, got a few of his farmers started in the dairy business. He reported 3 cream separators in his county that year. When Mr. Pryor left the county he left 55 separators. S. P. Dent followed and as the News Service item from the University of Tennessee says, Mr. Dent undoubtedly saw future to the dairy business, too. On June 1, 1923, the county had 155 separators. Three cream stations have been established and the farm is now the source of most of the cream. On an average, according to the report, the cash income per cow is $60.00 per year from cream checks. The dairymen have found that there is profit in cows and are ready to go. They have found that it pays a cotton farmer to keep a few cows around the place. They need the cash money.

Maybe there is a lesson in this for some other big cotton county where boll weevils have been doing a lot of dirt.—Southern Ruralist.

APRECIATED ADVICE

G. W. Sefrit & Sons, Delphos, Ia., veteran breeders of Big Type Poland-Chinas, for many years patrons and subscribers of the American Swineherd. The elder writes, upon enclosing his subscription for BAYNES' SOIL IMPROVER, "I thought you were making a mistake when you went into this new work, but after reading the paper, conclude you are doing a good work; you are not satisfied to be idle even at your age. You surely have been a wonderful prograssive, grand old man; hope you may live to be one hundred."

SOW AND COW TROUBLES

The breeders of swine have ccasions once in a while to be roubled with the loss of a litter f pigs by abortion.

It is not only the damage of he loss of the pigs, but many of he cases are contagious, and are should always be taken to lean up and burn all the disharges from the aborting sow r cow. Fresh air slacked lime hould be scattered on the round or floor where the disharges were made.

After many years' experience s editor of the American Swineerd, with the successful use of I. W. Kellogg Co., Abortion Cure, we have received thanks rom a large number of breeders early for recommending this reatment for the cure of aborion or failure to breed of sows r cows.

This firm issues a free booklet n abortion and failure to breed guaranteed treatment. This ook is filled with valuable intruction. Every farmer should ave one of them. State number f animals and the general conition in writing for free booklet nd cost of remedy, address H. V. Kellogg Co., 948 Carroll venue, St. Paul, Minn., mention AYNES' SOIL IMPROVER.

FACTS ABOUT COWS IN MISSOURI

The farmers of the state of Iissouri have to their credit 00,000 cows and the average ield is less than 140 pounds of utter fat per year. This low verage is largely due to the very w producing cows in many ounties where better dairying ethods are not practiced. Stastics showing several counties here the average butter fat for l their cows is less than 100 ounds a year. Jewell Mayes Veekly states better breeding ould double their present outut without increasing the numr of cows.

They have less than 20,000 ure bred dairy cattle of all eeds, out of 700,000 cows assed as milk cows. This emasizes the importance of getng rid of the scrub. Especially when it is shown that of all e butter fat per cow was 515 ounds, and 90 per cent of them ere owned by every-day farms.

L. E. Vaughn's Guernsey cow, Oronogo, Mo., sets state record for the highest semi-official butter fat test of 1,035 pounds in year.

This shows the magnitude of the improvement needed.

BRADFUTE IN EAST

O. E. Bradfute, president of the American Farm Bureau Federation, is closing this week his visit to the East. On Wednesday he attended the annual meeting of the New Hampshire Farm Bureau Federation at Concord, and is today attending the annual meeting of the Connecticut Farm Bureau Federation at Hartford.

SPEAKING IN OHIO

J. W. Coverdale, secretary of the American Farm Bureau Federation, is filling a series of speaking dates at Ohio county farm bureau annual meetings this week.

Mr. Coverdale is attending the meetings of the farm bureau in Portage, Stark, Mahoning and Columbiana counties.

PESSIMISTIC

A pessimist swallowed an egg whole. He was afraid to move for fear that it would break—and was scared to sit still, dreading it might hatch.

ADAMS COUNTY GIVES SERVICE

Ray E. Miller, Farm Adviser, Adams County, Illinois, reports that the Adams County Shippers' Association saved Adams County farmers in 1923 $50,000. This saving covers 700 cars of live stock shipped through the cooperative.

The Adams County Shippers' Association is but one of the cooperative agencies organized by the farm bureau in that county. The other producer-owned associations are Quincy Co-operative Milk Producers' Association, Western Illinois Fruit Exchange, and co-operative elevators at Ursa, La Prairie and Chatten.

The Adams County Shippers' Association sells directly through the Producers' Live Stock Commission Association at East St. Louis.

The Quincy Co-Operative Milk Producers' Association has developed in the last year from practically nothing to a business of $15,000 a month. A better milk supply has been provided without increasing the cost to the consumer but enabling the producer to make better returns upon his investment in live stock, land and equipment.

The Adams County report shows 1923 a year of service rendered by the farm bureau in almost every conceivable line. Among these services are reports of soil tests and soil survey, promotion of fairs and farm product shows, handling of hog cholera serum and the active sponsoring of bovine tuberculosis eradication campaigns.

BOURBON RED TURKEYS
LIGHT BRAHMA CHICKENS
PEKIN DUCKS
B. R. Turkey toms, June hatch at $10 each, nicely marked. Light Brahma cockerels, April hatch at $2 each and Pekin Ducks at $2 each.
We hold our customers by good treatment. Satisfaction guaranteed.
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BARGAINS—Spotted boars and gilts ready to breed and weanlings by five times Grand Champion, "Spotted Ranger." Also bred sows and gilts. Lloyd Lukens, Disko, Indiana.

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CHOICE weanling pigs from our reliable Poland-China herd, priced from Twenty to Forty Dollars. Write for literature.
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Devoted to the best interests of the swine industry, particularly to Berkshires, the hog that won Grand Championship over all breeds in the dressed carcass classes at the late International.

Easy feeders; meat of unsurpassed quality, profitable. The Berkshire hog is the best farm animal today.

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Both for $1.00

THE FROST
PUBLISHING COMPANY
Springfield, Ill.

American Farm Bureau Federation News

Arthur E. Mealiff, Mgr., Farm Bureau Office
58 East Washington St., Chicago, Illinois

THE YEAR 1924

The American Farm Bureau Federation has made a safe start for the year 1924. They steered clear of a danger that was lying in wait to capture some of the offices, for the personal benefit of those desiring to occupy them. The real true men of worth for the benefit of the bureau are working for the advantages and development of the business of the association.

They are branching out on lines that will be helpful to farmers.

EXPORT CORPORATION

Congress is holding hearings on the various agricultural relief measures. It is expected the bill introduced by Senator Norris for the government organization of a $100,000,000 export corporation which will buy and sell farm products will be given early consideration because of the fact that Senator Norris is chairman of the Agricultural Committee.

Loans for the Wheat Farmers

There are numerous other bills, however, which will have as full and possibly more sympathetic treatment by Congress before it adjourns. One, upon which it is hoped to get early action because upon its passage depends whether a large number of wheat farmers in the grain counties stay in business and plant more forage crops and produce livestock, is the bill introduced by Senator Peter Norbeck of South Dakota and Representative O. B. Burtness of North Dakota, which would appropriate $50,000,000, $20,000,000 of which is to become available the present fiscal year, $20,000,000 the next and $10,000,000 for the fiscal year ending June 30, 1926. This money would be handled by a commission to be known as the Federal Agricultural Diversification Commission, composed of the Secretaries of Agriculture, Commerce and Treasury, of which the Secretary of Agriculture would be chairman. As the bill is drawn, loans will be confined to livestock, including dairy, beef cattle, hogs, sheep and poultry. The loans will bear 6 per cent interest and be made for a period of not longer than five years. They will be secured by a first lien on the livestock and their natural increase.

INCREASE IN MEMBERS

The report of the Finance Department of the American Farm Bureau Federation, which was sent this week to state farm bureaus, shows an increase in membership of 30,000 for the fiscal year.

The report now shows that dues for 392,973 of the more than a million individual members reached the national headquarters during the year 1923.

A RECORD WEEK

The National Live Stock Producers Association estimates that the thirteen terminals operating under the national live stock co-operative plan will do a business totaling one hundred million dollars in 1923.

Last week the Chicago Live Stock Producers Association handled 503 cars and led the entire Chicago market. The coal operatives handled 122 cars more than the nearest competitor.

The Producers Co-operative Commission Association at Cleveland handled 171 cars or 24 per cent of the total on that market and was in first place last week.

The Farmers Union and Producers Commission Association at Sioux City, Iowa, handled 116 cars, over 9 per cent of the total and, ranked in second place.

The Producers Co-operative Commission Association at Pittsburgh handled 59 cars and was in second place.

At Buffalo, N. Y., the co-operatives handled 180 cars and were in first place, the nearest competitor handling 103.

Four hundred and twenty-eight cars or 25 per cent of the total was the record of the Indianapolis Commission Association last week

Seventy cars, in first rank, wa the report of the Peoria Producers Commission Association.

At Oklahoma City, the Produers handled 142 cars.

The Producers were in secon place at Sioux Falls, South Dakota with 9 cars or 21 per cent of th total receipts.

At the National Stock Yards (St Louis market) the Producers handled 322 cars and ranked secon place.

RELATIONS

The American Farm Burea Federation is pledged to a nationwide co-operative marketing program, and as a service organization is absolutely essential to th success of the co-operative associations. The Farm Bureau is th best equipped farm organization t render such service and we recognize that we need a more definit relationship between the Farm Bureau organizations and the commodity associations than has existed up-to-date.

It is the duty of National, Stat and County Farm Bureau to initiate and conduct organization wor of co-operatives, expenditures o that account to be repaid by the co-operatives association.

No organization work shall b undertaken by the marketing department of the Federation in an state nor any assistance be rendered any group therein withou the endorsement of the state far bureau.

County and State Farm Bureau should establish service relationship with co-operative association based upon written memoranda o understanding, these relationship to be determined by local or stat conditions, and to provide adequat compensation for services rendered by county and state far bureaus.

The Co-operative Marketing Department of the A. F. B. F. shal endeavor to establish a service relationship with national co-operatives, with the aim in view of co-ordinating the national co-operativ marketing movement for organization service and defense.

REPORT MUSCLE SHOALS SOON

Indications point to the early eport from the House Military Affairs Committee of the Madden ill which would accept the offer nade by Henry Ford to lease the lam and purchase the fertilizer vork at Muscle Shoals. The companion bill introduced by Senator Edwin F. Ladd of North Dakota s still before the Senate Agriultural Committee.

BEET GROWERS ORGANIZE

A state-wide organization of ugar beet growers in Utah will e made. The organization was tarted when representatives rom every factory district in the tate met at the office of the farm ureau in Salt Lake City.

Articles of incorporation with he organization were read and xplained by Frank Evans, attorey for the Utah Farm Bureau nd a member of the A. F. B. F. Executive Committee.

SAVE SHIPPERS $3,000

A saving of $24 a car, or about 3,000 a year, to farmers shipping hrough the co-operative elevator t Lewiston, Minn., has been seured by the combined efforts of he Winona County Farm Bueau Federation and the Amerian Farm Bureau Federation.

GATHER CONTRACT FORMS

The complete file of co-operaive marketing contracts now in se by co-operative marketing rganizations is being collected y the American Farm Bureau ederation.

In response to a request sent ut last week by J. W. Coverdale, ecretary of the American Farm ureau Federation, many copies f contracts have already come in. These contracts will be placed n the file of the Co-operative Marketing Department for refernce purposes.

TEN YEARS

Teacher—"Johnny, can you ive me a long sentence?"

Johnny—"No, sir, but I would ke to."—Boston Transcript.

EGG MARKETING WORK

Definite progress in the marketing of eggs was reported by the Missouri Farm Bureau Federation Egg Marketing Committee. Work was started about the middle of August in Pettis County. The project has now grown until the members of the Pettis County Farm Bureau have been able to make an average profit of $4.41 on each case of eggs shipped direct.

The Pettis County farmers under the leadership of Robert S. Clough, county agent, have done much in the way of preparation for the project in breeding, feeding and housing of poultry. "Quality," said County Agent Clough, "is the first essential to asuccessful co-operative egg marketing project."

REFUND $175,000

The savings of $175,000 in refunds to members of the National Live Stock Producers' Association during the first 21 months of operation at a saving of approximately $5 per car, is not the big accomplishment desired, according to John G. Brown, a dirt farmer from Monon, Ind., who is president of the National Live Stock Producers' Association.

"We are, of coure, very glad to pay the 30 per cent dividend represented by the $175,000 sent back to members, but we expect to do more when we get live stock producers to send their animals to market in more even numbers and in quantities comparable with the demand for meats.

"The present 'glut and famine' system of marketing live stock benefits no one but the retailer of meats," continues Mr. Brown. "Producers of live stock ship the bulk of their products on a down market, which means a loss.

"The packer doesn't benefit greatly by this because he varies his price of meat to the retailer in accordance with the fluctuation in the price of live stock. But the butcher keeps his prices at the peak and is really the only one who benefits by the drop in live stock prices caused by the present disorderly system of marketing live stock followed by producers.

"We are now handling about 10 per cent of the total live stock shipped to the markets where we operate, and when we increase this percentage materially, we expect to remedy the situation to the benefit of the producers, packer and consumer."

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that you are all descendants of Adam, so we are going to tempt you with a taste of

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the livest and most read paper devoted to the interests of pure-bred Duroc Jersey Swine. If you are interested in raising the volume of productivity of your farm you should become interested in the farmer's greatest hog, the pure-bred Duroc Jersey.

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Fig. 1 shows root system of alfalfa fertilized with GYPSUM. Fig. 2 shows root system without GYPSUM. From Bulletin 163 of Oregon Ag. Experiment Station

AGRICULTURAL GYPSUM

Gypsum has great value as a soil builder. Its application to clover, alfalfa and other legumes causes an enormous increase in the size of the root systems and tops of these crops. It produces many more nitrogen fixing nodules on the roots. This, in some cases, means ten or twelve times as much nitrogen fixed per acre, thus furnishing much more nitrogen for the farm and for later crops. That's why

A Gypsum Test Strip on Your Fields will Prove Its Worth in Greater Yields

In early Spring, just as growth starts, sow a strip across your alfalfa or clover field or across your white clover blue grass lawn and let it tell its own story. Rate of application 200 to 400 pounds per acre. Get a supply of Agricultural Gypsum from your nearest building supply dealer. Write us for free information on various uses of Agricultural Gypsum as an efficient and economical soil builder.

The Gypsum Industries, Dept. 112—844 Rush Street, Chicago, Illinois

THE SOURCE AND SUPPLY OF SULPHUR IN THE AIR

By Professor George A. Olson

Certain kinds of bacteria under suitable conditions destroy organic matter, at the same time setting free sulphur, some of which enters the air in the form of gas. Sulphur gas or substances containing sulphur also escape in the air as a result of burning fuel and the roasting of minerals.

The tarnishing of silverware, lead, lead paints and other metals is the result of sulphur in the air. Zinc, on the other hand, remains white, and for this reason is used in place of lead in the making of white enamel paints.

The effects of sulphur are very noticeable in cities, especially in some of the large centers of population. In fruit sections sulphur is burnt in drying kilns to prevent darkening of fruit during the process of drying. It is also used as a fumigant and for bleaching.

Recently estimates of the sulphur content of rainwater collected at Knoxville, Tenn. (an industrial city with a population of 100,000), have been reported as 94.5 pounds per acre. The quantity precipitated in 1918 was exceptionally high. About two and one-half miles from the city the average quantity of sulphur carried down is 51.5 pounds per acre annually. Seven miles west of Knoxville the quantity of sulphur added to the soil is 18.6 pounds annually.

The largest amount of sulphur is precipitated during the winter period, when coal is consumed in large quantities. In fact, a relation of sulphur to coal consumed is shown, and most of the sulphur volatilized is lodged in the zones where the air is most heavily laden with smoke.

Stewart estimates that 40 to 45 pounds of sulphur is precipitated at Urbana, Ill. Most of this sulphur undoubtedly is the result of burning large quantities of coal in both Urbana and Champaign. In Illinois farming communities away from cities the quantity of sulphur carried down has not yet been estimated. Dymong, Hughes and Jupe find a total of fifty pounds of sulphur in the rainwater obtained at Essex, England. These men contend that this is a much larger quantity than is added to soil in purely agricultural districts.

Erdman estimates that about fifteen pounds of sulphur per acre is carried down in the rains on Iowa farms. Other estimates show 5 to 15 pounds of sulphur being added to each acre annually. The data thus far submitted clearly show that the amount of sulphur added to soil is exceedingly large in heavily populated zones and very small in purely agricultural districts. There are sufficient variances submitted to show that results for one zone are not applicable to another.

The parallelism of quantity of coal consumed and the amount of sulphur contained in air substantially confirms the view that the burning of coal is the chief source of atmospheric sulphur. Crocker has deduced that about 13.42 pounds of sulphur contained in coal escaped and diffused uniformly in the air. Since about three-fourths of the sulphur in coal remains in the ashes, it is likely that three to five pounds of sulphur per acre would represent the total quantity derived from this source. Most of it, however, accumulates in industrial zones so that very little actually reaches farm communities. Some of the sulphur estimated is derived from decomposition of organic matter, and a portion is also obtained from particles of dust carried in the air.

While the quantity of sulphur carried down in the rains at University farm, near Knoxville, Tenn., is large, other data reported by McIntyre show that as much sulphur is leached out of the soil as is added. Accordingly there is a tendency to sulphur depletion in the soils since much of the sulphur removed by crops may be considered lost. Hall of England estimates that rain removes three times as much sulphur as is carried down and Erdman finds the loss of sulphur to be about four times the return.

River waters contain much sulphate sulphur. The sulphur content of the Ohio River amounts to 2,229,544 pounds annually. This is equal to 35 pounds of sulphate sulphur to the acre for the entire river basin. An estimate of the sulphur losses for the entire United States would show prodigious figures. The average loss of sulphur through drainage, therefore, far exceeds the quantity returned by means of rains.

When it is considered that crops remove about as much sulphur as phosphorus, and only a small amount of phosphorus is lost through drainage as compared with sulphur, one can readily realize the significance of sulphur as a factor in plant nutrition. Dymond, Hughes and Jupe who found a total of 50 pounds of sulphur in the rains at Essex England, nevertheless obtained increases in yield of legumes through the use of sulphur fertilizers. In fact, these men state that sulphur should be included in artificial fertilizers in order to obtain maximum yields of the highest feeding value. The increased yields reported in the states of California, Montana Oregon and Washington as a result of applying gypsum show conclusively that crops frequently suffer from lack of available sulphur. There are various localities in the East and South where gypsum has been used since the beginning of agriculture. Some of these places are not far from smoke zones.

One would be inclined to believe that the lawns of a city th size of Chicago would be fairly well soaked with sulphur, bu there are lawns which have been greatly improved through th use of gypsum. The maximum quantity of sulphur is carried down during the winter months however, and by spring a good share of it presumably is run of with the melting snows. The frequent sprinkling of the lawn tends to hasten the removal o the soluble sulphur, and this probably is the main reason why applications of gypsum renew the growth of clover.

Recent Illinois soil report show much of the soil to be muc lower in sulphur than in phosphorus. If the sulphur containe in the Chicago or Urbana zone were an index of possible supplies of sulphur for Illinois conditions one would expect to fin the sulphur content of all th soils to be quite uniform. Th soils should show a tendency t increase rather than decrease i sulphur.

This undoubtedly explains th reason why large yields of cor and wheat are frequently obtained through the direct applica tion of gypsum to cereal crops. Frequently the good effect of gypsum on legumes is carried over to serve in the cereal crops. In either case the sulphur must be available and assimilable in sufficient quantities for maximum production.

Small quantities of assimilable sulphur limits production. Applications of gypsum increase production in all instances where sulphate sulphur is the limiting factor. This view prevails regardless of the nature of the crop.

In soils requiring only sulphur treatment agricultural gypsum has been more effective than equivalent amounts of gypsum in acid phosphate. In soils requiring both sulphur and phosphorus, acid phosphate may be applied, but it is also possible to increase the yields through the use of a combination of finely ground rock phosphate and gypsum.

It is obvious that the sulphur carried down with rains lodges largely within industrial zones, and therefore is of very little value for agricultural purposes. The quantity removed by crops must therefore be considered a loss. This means that the tendency is toward depletion of sulphur in soils. All sulphur contained in soil is not available and yields depend largely upon the food that is readily assimilated.

Applications of gypsum will supply the readily assimilated sulphate sulphur, and in soils responding to this treatment profitable crops are produced. Gypsum is particularly valuable in the growing of legumes largely because the demand for sulphate sulphur is so large. An equivalent weight of a cereal crop will require nearly as much sulphur.

Obviously, no dependence can be placed on the sulphur carried down by rains. Neither does such sulphur serve as an index of what plants will need. Applications of gypsum, on the other hand, will tell the story. It may show an mmediate response, although sometimes time is required. These statements are based on experiences of many farmers and are equally as valuable as are the scientific observations.

BALANCED CROP

The young man was holding orth on the services rendered by science to agriculture.

"I tell you," he said to on old farmer, "that the time is coming when you'll be able to carry all the fertilizer necessary for an acre of ground in one waistcoat pocket."

"And all the crop in the other," answered the farmer.—Tit-Bits.

THE NITROGEN PROBLEM VALUABLE INFORMATION

Nitrogen presents the greatest practical soil problem in American agriculture. Four important reasons for this are: its increasing deficiency in most soils; its cost when purchased on the open market; its removal in large amounts by crops, and its loss from soils through leaching. Nitrogen costs from four to five times as much per pound as phosphorus. A 100-bushel crop of corn requires 150 pounds of nitrogen for its growth, but only 23 pounds of phosphorus. The loss of nitrogen from soils may vary from a few pounds to over 100 pounds per acre, depending upon the treatment of the soil, the distribution of rainfall and the protection afforded by growing crops.

An inexhaustible supply of nitrogen is present in the air. Above each acre of the earth's surface there are about 69,000,000 pounds of atmospheric nitrogen. The nitrogen above one square mile weighs 20,000,000 tons, an amount sufficient to supply the entire world for four or five decades. This large supply of nitrogen in the air is the one to which the world must eventually turn.

There are two methods of collecting the inert nitrogen gas of the air and combining it into compounds that will furnish products for agricultural uses. These are the chemical and the biological fixation of the atmospheric nitrogen. Farmers have at their command one of these methods. By growing inoculated legumes, nitrogen may be obtained from the air, and by plowing under more than the roots of those legumes, nitrogen may be added to the soil.

Inasmuch as legumes are worth growing for feed and seed as well as for nitrate production, a considerable portion of the nitrogen thus gained may be considered a by-product. Because of that fact, it is questionable whether the chemical fixation of nitrogen, the possibilities of which now represent numerous compounds, will ever be able to replace the simple method of obtaining atmospheric nitrogen by growing inoculated legumes.

For easy figuring it may well be kept in mind that the following amounts of nitrogen are required for the produce named:

One bushel of oats (grain and straw) requires 1 pound of nitrogen.

One bushel of corn (grain and stalks) requires 1½ pounds of nitrogen.

One bushel of wheat (grain and straw) requires 2 pounds of nitrogen.

DON'T make the mistake of thinking that every machine with four wheels, a box and a few teeth and paddles at the rear, is necessarily a good manure spreader.

Play safe when you buy. Get the genuine

NEW IDEA
The Original Wide Spreading Spreader

No tool on your farm will bring you bigger profits. The New Idea makes it easy to feed your land regularly with Nature's greatest soil-sustainer, manure. And the New Idea stays on the job long after the imitators are on the scrap-pile. It is built by "Spreader Specialists," in the best equipped spreader factory in the world.

Drop in when you are ready to talk spreader. Get the facts now--even if you are not ready to place your order.

There is a dealer in your Locality. See him or write for catalog.

The New Idea Spreader Co.
Coldwater, Ohio

One ton of timothy contains 24 pounds of nitrogen.

One ton of clover contains 40 pounds of nitrogen.

One ton of cowpeas contains 43 pounds of nitrogen.

One ton of alfalfa contains 50 pounds of nitrogen.

One ton of average manure contains 10 pounds of nitrogen.

One ton of young sweet clover, at about the stage of growth when it is plowed under as green manure, contains, on water-free basis, 80 pounds of nitrogen.

The roots of clover contain about half as much nitrogen as the tops, and the roots of cowpeas contains about one-tenth as much as the tops. Soils of moderate productive power will furnish as much nitrogen to clover (and two or three times as much to cowpeas) as will be left in the roots and stubble. In grain crops, such as wheat, corn and oats, about two-thirds of the nitrogen is contained in the grain and one-third in the straw or stalks.—From Soil Report No. 25, Agr. Expt Sta., Ill. Univ.

IS NOW A FAMOUS PASTURE

Was Established According to College Plan in March, 1915

Farmers around Holland, Mo., a short distance north of the Arkansas state line, have become very much interested in a seven-acre pasture of mixed grasses that established on the Fisk farm in that locality during the spring of 1915 in accordance with specific directions supplied by the department of field crops of the Missouri College of Agriculture. Inquiries are now reaching the college from men in that section desiring the same information to enable them to get similar results on their own land. An inquiry dated January 5, 1924, from a farmer near Blytheville, Ark., follows:

"Dear Sirs: Mr. Fish, of near Holland, Mo., who lives in Pemiscot County, has a remarkable seven-acre pasture planted in March, 1915, in accordance with your letter of about February 4, 1915, and on which he used the five kinds of grass seed: timothy, alsike clover, bluegrass, orchard grass and redtop. Will you kindly send a similar letter of instruction to W. M. Burns, Blytheville, Ark., and to W. F. Hawkins, Box 453, Lepanto, Ark.? They have the same kind of land and will greatly appreciate your letter. May I have a copy?"

The directions for obtaining a permanent pasture on soils of that locality as originally supplied by the college to Mr. Fisk in 1915 were as follows:

"A mixture of 5 or 6 pounds of orchard grass, 4 or 5 pounds of timothy, 6 or 8 pounds of redtop, 6 or 8 pounds of bluegrass and 2 pounds af alsike clover, would make a very good pasture for the conditions you have described. You could sow this in the spring when the ground is dry enough to work, drilling in about one bushel of oats and a nurse crop. cut the oats for hay when their seed first becomes milky."

This instance well illustrates one of the many lines of service the farmer anywhere in Missouri can get from his state college of agriculture at Columbia. Eleven different departments of the college daily receive inquiries on farm problems demanding immediate solution, and all such inquiries receive prompt and specific answers. It is one of the types of service for which the college was established.—Mo. Agr. Col.

THE PHOSPHORUS PROBLEM

The element phosphorus is an indispensable constituent of every living cell. It is intimately connected with the life processes of both plants and animals, the nuclear material of the cells being especially rich in this element.

The phosphorus content of a soil varies according to its origin and the kind of farming practiced. Even virgin soils are found that are deficient in phosphorus.

It should always be borne in mind in connection with the application of phosphorus to the land that the addition of phosphorus, or of any other fertilizing substance, to the soil can exert no benefit until the need of it has become a limiting factor of production. For example, if there is already present in the soil sufficient available phosphorus to produce a 40-bushel crop, and the nitrogen supply or the moisture supply, if sufficient for only 40 bushels or less, then extra phosphorus added to the soil cannot increase the yield beyond this 40-bushel limit.

There are several different materials containing phosphorus which are applied to land as fertilizer. The more important of these are bone meal, acid phosphate, natural raw rock phosphate and basic slag. Obviously that carrier of phosphorus which gives the most ecomonical returns, as considered from all standpoints, is the most suitable one to use. Although this matter has been the subject of much discussion and investigation, the question still remains unsettled. Probably there is no single carrier of phosphorus that will prove to be the most economical one to use under all circumstances because so much depends upon soil conditions, crops grown, length of haul and market conditions.

Bone meal, prepared from the bones of animals, appears on the market in two different forms, raw and steamed. Raw bone meal contains, besides the prosphorus, a considerable percentage of nitrogen, which adds a useless expense if the material is purchased for the sake of the phosphorus. As a source of phosphorus, steamed bone meal is preferable to raw bone meal. Steamed bone meal is prepared by extracting most of the nitrogenous and fatty matter from the bones, thus producing a more nearly pure form of calcium phosphate containing about 10 to 12 per cent of the element phosphorus.

Acid phosphate is produced by treating rock phosphate with sulfuric acid; the two are mixed in about equal amounts; the product, therefore, contains about one-half as much phosphorus as the rock phosphate itself. Acid phosphate also contains, besides phosphorus, sulphur, which is another plant-food element. The phosphorus in acid phosphate is more readily available for absorption by plants than that of raw rock phosphate. Acid phosphate of good quality should contain 6 per cent or more of the element phosphorus.

Rock phosphate, sometimes called floats, is a mineral substance found in vast deposits in certain regions. The phosphorus in this mineral exists chemically as tri-calcium phosphate, and a good grade of the rock should contain 12½ per cent or more of the element phosphorus. The rock should be ground to a powder, fine enough to pass through a100-mesh sieve, or even finer.

The relative cheapness of raw rock phosphate, as compared with the treated or acidulated material, makes it possible to apply for equal money expenditure considerably more phosphorus per acre in this form than in the form of acid phosphate, the ratio being, under the market conditions of the past several years, about 4 to 1. That is to say, under these conditions, a doller will purchase about four times as much of the element phosphorus in the form of rock phosphate as in the form of acid phosphate, which is an important consideration if one is interested in building up a phosphorus reserve in the soil. As explained above, more very carefully conducted comparisons on various soil types under various cropping systems are needed before definite statements can be given as to which form of phosphate is most economical to use in all situations.

Basic slag, known also as Thomas phosphate, is another carrier of phosphorus that might be mentioned because of its considerable usage in Europe and eastern United States. Basic slag phosphate is a by-product in the manufacture of steel. It contains a considerable proportion of basic material and therefore it tends to influence to some extent the soil reaction.

Rock phosphate may be applied at any time during a rotation, but it is applied to the best advantage either preceding a crop of clover, which plant seems to possess an unusual power for assimilating raw phosphate, or else at a time when it can be plowed under with some form of organice matter, such as animal manure or green manure, the decay of which serves to liberate the phosphorus from its insoluble condition in the rock. It is important that the finely ground rock phosphate be intimately mixed with the organic material as it is plowed under.

In using acid phosphate or bone meal in a cropping system which includes wheat, it is a common practice to apply the material in the preparation of the wheat ground. It may be advantageous, however, to divide the total amount to be used and apply a portion to the other crops of the rotation, particularly to corn and to clover.—From Soil Report No. 25, Agr. Expt. Sta., Ill. Univ.

FARMERS SLOWLY EMERGING FROM NUT CRACKER

(By the Department of Research)

The net cash receipts of American farmers this year will be over $600,000,000 above last year. Interest and taxes will probably be slightly less. Thus the jaws of the nut cracker, formed by declining receipts and rising "fixed charges," between which the farmers were so painfully pinched for two years, are beginning to open up. What the man on the farm gains from now on he can hold for himself.

The readjustment, nevertheless, is by no means complete. Instead it is discouragingly slow in a great number of particulars. Many farmers are losing their land through foreclosure proceedings. In the corn and wheat producing states 8½ per cent of the farms have been taken over under foreclosure during the period between 1920 and the spring of 1923.

Many farmers can see no progress in the past year. The year's gains have been widely distributed in most sections of the country but are in part offset by losses that have fallen in the Northwest and in numerous scattered localities.

Nearly half of the $650,000,000 gain is to be credited on the cotton crop but by no means are all cotton growers prosperous. Texas and the Carolinas have large yields to sell at near-famine prices. But the cotton crops of Arkansas, Mississippi, Alabama and parts of Georgia will sell for less than last year.

The farm price of corn is considerably higher this year than last, but the 20 per cent of the crop sold for cash will bring in only about $100,000,000 more return. Dairy and poultry products will probably yield some $225,000,000 increase. The total increase is largely accounted for by these four groups: Cotton, dairy, poultry and corn.

The wheat crop will sell for $135,000,000 less than in 1922-1923, the losses being confined mainly to North Dakota, Kansas, Nebraska and South Dakota, with a large increase recorded in Washington.

Cattle, on the whole, will bring in about as much cash as last year. Feeding operations are fairly satisfactory. On the ranges liquidations has been in progress due to unsatisfactory prices. The readjustment has probably about run its course and daylight appears ahead in the cattle business. Hogs, in spite of enormous production, will bring only about the same cash income as last year, and feed costs are considerably higher.

MISSOURI DAIRY-ISMS

The best scrub in the world is a dead one.

Breeding is the only dependable and practical way of increasing the fat content in cow's milk.

The best cross we know of, for some of our livestock, is the corncrib and haymow cross.

It is doubtful if there is such a thing as the "best" breed of dairy cows. The cow to avoid is the scrub or mongrel.

There are a lot of folks who think bedding, curry combs and brushes were intended only for horses, and wonder why their cows don't keep clean.

"Registration papers" do not necessarily mean "profitable cows," but among the better bred dairy cows, the larger percentage of good ones are found.

Many men have fifteen or twenty dairy cows worth $2,000 to $2,500, representing one-half the herd, and will breed all their cows to a $25 bull, representing the other half. "Strange but true."

Men who think the cow and the hen are with us only to provide pin money for the women and children, often find the pin money fund handy to provide themselves with tobacco.—*E. G. Bennett, State Dairy Commissioner of the Missouri State Board of Agriculture.*

HELPS OUT THE FARMER

BAYNES' SOIL IMPROVER is the best magazine out in helping the farmer. I do not want to miss a copy.—O. W. Ruder, Wisconsin.

FOOD FACTS

Your livestock must have the proper amounts of proteins, carbohydrates, vitamines, minerals and other necessary ingredients to properly grow and develop.

Your growing plants and grains must have Nitrogen, Phosphorus, Potash and other vital elements to maintain a vigorous growth and produce maximum yield.

YOU FEED YOUR LIVESTOCK A BALANCED RATION

Then Why Do You Neglect Your Soil?

A correspondent, in commenting recently on the need of extensive fertilization on his farm, stated that he realized the need as pointed out in the pages of

BAYNES' SOIL IMPROVER

but that at present could not afford to apply the necessary materials.

REALLY THIS MAN IS NO DIFFERENT THAN THOUSANDS OF OTHERS

He is mistaken, though, in his statement, as a careful analysis of the situation will show that

HE CAN'T AFFORD NOT TO FERTILIZE

As every dime spent for plant food will be returned many times over in increased crop yields, just as the outlay you make to feed your stock scientifically yields a greater return in pork, beef or butter fat.

1924 HOLDS GREAT PROMISE

Prepare for it by a more painstaking survey of your soil's needs. You can do your neighbor a lasting favor by telling him about BAYNES' SOIL IMPROVER—the cheapest expert help he can hire—12 months for 25c, or 5 years for $1.00, with valuable booklet, "Feeding Dairy Cows," as a premium.

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